



FRIDAY, FEBRUARY 3.

## NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

**Meetings Next Week.**—Chicago & Eastern Illinois.—Huntindon & Broad Top Mountain.—Philadelphia & Erie.—Schuylkill & Lehigh Valley.—Wheeling & Lake Erie.

**Elections.**—Boston & Lowell, T. Jefferson Coolidge, President.—Chicago, St. Paul & Kansas City, R. Du Puy, Second Vice-President; J. M. Egan, General Manager.—Coudersport & Port Alleghany, F. W. Knox, President; Miles W. Barse, Treasurer.—Dallas & New Orleans, James P. Simpson, President.—Duluth, South Shore & Atlantic, George T. Jarvis, Superintendent.—East & West Alabama, Jefferson M. Levy, President.—Kansas City & Bonner Springs Rapid Transit, W. G. Simpson, President.—New York, Lake Erie & Western, E. B. Thomas, Second Vice-President.—Richmond & Danville, Peyton Randolph, General Manager.

**New Companies Organized.**—Kansas, Texas & Mexican files articles of incorporation in Kansas.—Nebraska Southern files articles of incorporation in Nebraska.—Omaha, Horace & Southwestern files articles of incorporation in Kansas.—Rio Grande & Utah is incorporated in New Mexico.—Virginia & North Carolina Construction Co. incorporated in Virginia.—Williamsville, Marlborough & Buffalo obtains charter in New York.—Winterville & Pleasant Hill obtains charter in Georgia.—Youngstown & Buffalo is organized in New York.

**Changes and Extensions.**—Alabama: Louisville & Nashville makes permanent location to Huntsville. Montgomery & Florida will be extended northward.—Arkansas: Chicago, Hannibal & Springfield will be extended to Little Rock.—California: Los Angeles, Long Beach & Ocean begins work. Pomona & Elsinore is to be extended to Claremont. Southern Pacific will begin a line from Anaheim to Santa Ana.—Connecticut: Meriden & Waterbury is completed.—Dakota: St. Paul, Minneapolis & Manitoba has secured right of way from Grafton to the boundary line.—Georgia: Cincinnati, Huntsville & Birmingham surveys its line. Macon & Covington will be extended to Monticello, Eatonton and Griffin.—Illinois: Chicago, Madison & Northern is completed from Freeport to Madison.—Kansas: Leavenworth & Denver Short Line surveyed west from Stockdale.—Michigan: Chicago, Kalamazoo & Hastings completes survey from Hastings to Portland.—Mississippi: Kansas, Memphis & Birmingham is completed between Amory and Aberdeen.—Missouri: The survey of the Central Missouri is completed to Fayette. Contracts let for Kansas City & Sabine Pass line between Kansas City and Pierce City.—New York: Rochester, Hornellsville & Lackawanna is opened. Youngstown & Buffalo surveys from Youngstown to Buffalo.—Texas: Galveston Air Line is making surveys. Missouri Pacific reaches Carrollton. Texarkana Northern, makes permanent location between Texarkana and Ft. Smith.

**Traffic.**—Anthracite coal shipments for the week ending Jan. 28 show a decrease of 26.2 per cent., as compared with the same period last year; bituminous shipments show an increase of 31.7 per cent. Cotton receipts, interior markets, for the week ending Jan. 27 show a decrease of 51.9 per cent., as compared with the corresponding week last year; shipments show a decrease of 31.1 per cent.; seaport receipts show a decrease of 32.0 per cent.; exports a decrease of 39.1 per cent.; cotton in sight is greater than at the same date last year by 4.9 per cent.

**Earnings.**—For the month of December 14 roads report gross and net earnings, all showing an increase in gross and two a decrease in net; the net increase is \$5,987,949, or 13.7 per cent.

**Miscellaneous.**—Hamilton & Northwestern passes under control of the Grand Trunk.—Sugar Grove & Warren, and Sugar Grove & Mayville consolidated.

## Contributions.

## The Dimensions of the M. C. B. Type of Coupler.

ST. LOUIS, Jan. 30, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The Lorraine Coupler Co. does not agree with the report of the Special Committee on Standard Couplers in its statement that the dimensions of other couplers vary but slightly from the dimensions given in their report.

While we consider that 21½ in. is the proper length of the stem of the drawbar, we find that a properly proportioned and constructed coupler of the M. C. B. type does not require a head projecting as far from the end of the car as a coupler with the dimensions shown in your issue of Jan. 27, which makes the distance between the cars, when coupled, too great to be stepped across with safety. Any master car-builder can take the dimensions given and figure for himself that they throw cars apart without tension on the draw-springs 32 in., and with tension on the draw-springs 35½ in. These extreme dimensions make it necessary to use the unusually long dead blocks given, 9 in.

If a vertical plane coupler is properly constructed it can be made so strong that the expense of dead blocks is entirely

needless, for it will take all the buffing that can be given it. But if it is so weak as to need the protection of dead blocks, it can still be so proportioned, without any detriment to the coupler, that it can be used with shorter dead blocks than 9 in.

M. J. LORRAINE.

## The Demurrage Question.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest the report of the demurrage agreement at Omaha, contained in your issue of Jan. 27, together with your editorial comments thereon. I observe that you speak of the subject as a live one, and as "such an important problem that every ray of light shed upon it should be noted," and am thereby emboldened to offer a few rays from the standpoint of the shipper, which might otherwise be overlooked.

From this standpoint I would in the first place object to the implication conveyed in your phrase, "the wide-spread evil of using cars as storehouses," and disclaim for the great body of those who receive car-load freight any desire to use the cars for storage purposes. I can conceive that it might be an object to persons who have no storage facilities of their own, and who have goods consigned to themselves for the purpose of selling to others, to make use of the cars for storage purposes, but the great majority of consignees having their own plants, where the freight must ultimately be placed, have no need or desire to use the cars as storehouses unless they should receive goods in excess of their storage facilities. The truth is, however, that the detention of cars is due to many causes, some of which are under the control of the consignees and some are not, such as the state of the weather, difficulty of procuring labor, strikes and combinations of workmen. Sometimes the railroad company is entirely at fault, and sometimes there is contributory negligence, as where cars are not shifted promptly, or are placed where it is inconvenient to unload them. In large manufacturing establishments, receiving from 10 to 100 cars a day, coming from many different quarters, it is impossible, with the best will and intentions in the world, to avoid an occasional blockade. I speak from experience.

Hence arises the first difficulty. In order to be within the meaning of the law, demurrage charges, if established, must be assessed impartially upon all consignees whose freight is not unloaded within the fixed time; and, as the charges are based on the records of car accountants, or yard clerks, who are not in a position to decide upon the merits of each case, the charges must be so assessed, in all cases, and be subject to appeal, and an officer, or a board, becomes arbitrarily the interpreter of the law and the administrator of justice.

In the second place, the charges for car detention should be just and reasonable. Now, to the shipper, it seems a mockery of justice to charge him for every car detained by him for more than 48 hours, and, on the other hand, to hold his freight on the road, sometimes for weeks, when he may be suffering for it, and allow him no redress. In order that there may be justice, there must be reciprocity, and the committee which formulated the demurrage rules at Omaha, should have gone a step farther and fixed a limit, say 24 hours for every 150 miles, beyond which every shipper or consignee should be allowed demurrage on his car-load freight when delayed en route.

A case recently came to my notice where a car-load of freight lay for two weeks on a siding within three miles of the place where the car was loaded, notwithstanding that the shipper and the consignee of the freight were daily urging the freight department of the railroad company to trace the car. Great and actual pecuniary loss is thus frequently caused to shippers, and when they appeal for redress they are met with the bland reply: "My dear sir, we contracted to deliver your freight, which we have done. We did not contract to deliver it within any specified time."

How does it come, then, that the railroad companies can collect demurrage on their cars, but the shippers cannot collect demurrage on their freight? How did the Irishman play the fiddle? "By main strength, bejabbers." There is no mention made in your report of the Omaha agreement, of the manner in which the payment of the demurrage charges is to be enforced. Apparently the Omaha committee did not deem the question worthy of consideration—that is, whether the shippers might not demur at the charges. In fact the *modus operandi* of their collection is simple, and well understood. If a consignee refuses to pay a demurrage charge which he holds to be unjust or unreasonable, he is informed that the next shipment that arrives for him will be sent to a public store, or unloaded at his expense at some inconvenient place, or the transportation of further shipments for him will be refused until the charges in question are paid. In any ordinary business, when payment of a bill is refused, the claimant has his remedy in the common law; but the railroad companies do not need the common law when they are dealing with shippers; they have a law of their own—the law of the stronger. Do you wonder that notwithstanding the Inter-state Commerce law, many merchants and manufacturers look upon the railroad companies as the real "robber barons" of our time?

But demurrage charges, as well as freight charges, should be reasonable. Let us examine the scale of charges adopted at Omaha, and see whether there is any sweet reasonableness in it. It is as follows: For the first 48 hours, no charge; for the first five days thereafter, \$1 per car per day or fraction thereof; for the next five days, \$2 per car per day or fraction thereof; and thereafter \$4 per car per day or fraction thereof. This is equivalent to a rental of \$26, \$52 and \$104 per car per month, or estimating the value of a freight car at \$500, 62½ per cent., 125 per cent., and 250 per cent. per annum. If this does not out-Shylock the money lenders

and cast a sickly glow over the real-estate agents, then I have wasted my time in writing this letter!

I know the specious answer to this, and have given it due consideration, namely: "Cars are very scarce; they are worth \$5 apiece per day to us." But the demurrage charge does not fluctuate with the abundance and scarcity of cars. It is a fixed quantity, and if based on the extrinsic value of the car it should be on the average extrinsic value. Now, I do not think that can be more than 10 per cent. per annum of the cost of the car; for I do not believe the railroad companies would be so short-sighted as not to buy more cars, if they were worth 10 per cent. per annum to them. At any rate, they ought not to tax the shippers for their own short-sightedness.

What is a reasonable charge for the detention of cars? We need not figure it, for the railroad companies have done that themselves. There is honor among railroads; they do not rob each other—at least not in the form of demurrage charges—and the charge of 15 cents per car per day fixed by some of the railroads among themselves, under the "per diem" car service system, indicates what they think to be about right. If they can get more than this from shippers, by threats of cutting off their supplies and injuring their business, that is clear gain, particularly if collected for the use of cars belonging to some other railroad company.

When the millennium comes, shippers will perhaps pay 15 cents per car per day for car detention, but they will not murmur, for the railroad companies will allow them an equivalent sum for detention of their freight.

Contrary to all ordinary business principles, the demurrage question assumes this shape, that the larger the business a shipper does with a railroad company, the more he is taxed for the privilege of doing it; for the small shipper, who receives an occasional car-load, can, or ought to, unload without trouble, but with a large manufacturing establishment, receiving many cars a day, this is, as explained above, impossible.

J. F. H.

## Railroads and Trade Centres.

NEW YORK, Jan. 16, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a brilliant and slashing style distinctively his, Mr. Appleton Morgan, in the January number of the *Popular Science Monthly*, writes upon the subject of Railroads and Trade Centres. Senator Cullom's remarks form the text of the article, and these are in part as follows: "Centres of trade are created by railroad favoritism, which has diverted trade from its natural channels into artificial ones at the expense of less favored localities." It is against this idea and against the possibility of creating an artificial trade centre by railroad or any other power, that Mr. Morgan brings his batteries to bear. The expensive struggles of the railroads to find entrances into New York or Chicago instead of forming "trade centres of their own," are happily set forth and the conclusion drawn that the crime of the railroads consists in that they have not "diverted trade from its natural channels."

At the outset we are confronted by the difficulty of defining this term, trade centre. Mr. Morgan names the following cities as justly so-called: New York, Boston, Baltimore, Philadelphia, New Orleans, Chicago and San Francisco. He specifically excludes Milwaukee, and consequently every interior city. If the term is to be confined to Chicago and New York, his article is true enough; but unquestionably Senator Cullom used the word in a much broader sense. In the common talk of the day a place is a trade centre when from it goods are sold and shipped by a wholesale merchant to a distant retailer. The test of a commercial centre, therefore, is the existence of the jobber. With this definition in mind, Mr. Morgan's criticisms only partly cover the ground. Have railroad rates had any effect in establishing trade centres in this latter sense? Most assuredly. The Hepburn Committee in 1879 found that the prosperity of such wholesaling cities as Syracuse had been built up through favoring rates. To take more modern instances: the merchants of Salt Lake City were recently complaining that freight rates favoring Denver were injuring their trade with outlying towns. We all know of the triangular fight between St. Louis, Kansas City and Wichita for the trade of Southeastern Kansas, in which freight rates are the determining factors. The cities of Nebraska are rapidly involving themselves in an all-round quarrel in which appeals are made to general freight agents with the full knowledge of the importance of the assistance of those gentlemen in increasing trade. Lincoln complains to the Inter-state Commission because Omaha has a cheaper rate from the Pacific, while Omaha in turn complains because the rate from Chicago to Lincoln is less than the sum of the locals through Omaha. The situation in Nebraska is full of interest to the student desiring to know the effect of rates upon wholesale trade. The reports of the Iowa Railroad Commission bear eloquent testimony to the value of railroad favoritism to the trade of Des Moines. Albuquerque, N. M., controlled much of the buying and selling along the Atlantic & Pacific Railroad from the same cause. None of the places named have the benefit of water competition, and hence there is nothing but the railroad to set one place above another. "Is it not true that it must cost more to go where everybody wants to go than to go where nobody wants to go?" Surely, surely that sentence must have slipped unawares from Mr. Morgan's pen. It is so contrary to all the known facts and laws of transportation that it were idle to do more than call attention to it.

There is a story of a man who made a giant, which becoming alive enslaved the maker. This is the history of many a trade centre. Prospered by "wholesale" rates it has invited



other roads to compete for its traffic until it could dictate terms to its original benefactor. Paradoxical as it may seem, there have been complaints against our railroads because they did and because they did not create trade centres; in the latter case the roads favored certain cities which might have been naturally or artificially created originally. It is the business of railroads to compete for the water traffic between Chicago and New York, certainly, but that is by no means their chief duty. I boldly assert that, being itself an artificial highway, the railroad can attain its highest excellence only when giving interior towns such advantages as will neutralize the water competition of the more favorably situated cities. When therefore, Mr. Morgan condemns the Inter-state law because it attempts to equalize by statute what nature and cosmic forces have rendered unequal, he is simply saying in another way that we should not use artificial means to overcome any of our natural disabilities or physical weaknesses. That such cities as New York and Chicago are natural (i. e., water) trade centres whose importance cannot be taken away, none disputes; but that fact does not cover our transportation problem.

THOS. L. GREENE.

#### Continuous Brakes in Europe.

The report of the brake committee of the European International Railroad Congress states that continuous brakes are every year becoming more largely used in Europe. The number of locomotives and cars fitted with these brakes in the different countries is given as follows:

France:	Brake.	Locomo.	Cars.	Outlay.
State Railroads.....	Wenger's automatic.....	272	2,702	
Western.....	Westinghouse.....	560	3,880	\$1,000,000
Paris, Lyons & Mediterranean.....	Westinghouse.....	493	5,113	1,300,000
Southern.....	Westinghouse.....	59	810	158,000
Orleans.....	Westinghouse.....	288	810	708,500
Northern.....	Wenger.....	228	820	
	Hardy non-automatic.....	784	3,873	1,276,000
Paris, Lyons & Mediterranean.....	Hardy.....	47	409	These are used in through traffic.
Eastern.....	Westinghouse.....	359	2,173	
Belgium:				
State Railroads.....	Westinghouse.....	582	3,973	836,000
Grand Central of Belgium.....		7	45	
Italy:				
Adriatic.....	Hardy vacuum.....	93	470	271,200
Mediterranean.....	Westinghouse.....	108	460	

England:  
89 per cent. of the locomotives and 83 per cent. of the passenger coaches are provided with continuous brakes as follows:

Brake.	Locomotives.	Cars.
Westinghouse.....	1,716	14,519
Automatic vacuum.....	2,185	11,714
Smith's vacuum.....	1,250	7,773
Vacuum and other systems.....	657	4,548

The cost of equipping appears to have been in France about \$800 per engine and \$180 per passenger car. These figures doubtless include in many cases the cost of foundation brake rigging.

	Westinghouse.		Other systems.		Total.	
	Locos.	Cars.	Locos.	Cars.	Locos.	Cars.
France.....	1,759	12,786	1,331	7,804	3,090	20,590
Belgium.....	582	3,973	7	45	59	4,018
Italy.....	108	460	90	470	198	930
Great Britain.....	1,706	14,519	4,092	24,035	5,798	38,554
Total.....	4,155	31,728	5,520	32,354	9,675	64,082

The above table shows the total number of engines and cars fitted in the countries named. As, however, the Hardy brake is extensively used in Austria, the Carpenter brake in Germany and the Westinghouse in Holland and Russia, the figures do not give a very complete idea of the extent to which continuous brakes have been adopted in Europe. Probably nearly 100,000 cars are equipped and about 14,000 engines. The magnitude of these figures may be best appreciated from a comparison with the number of passenger cars in this country. There were, according to Poor's Manual, 25,577 passenger, baggage, mail and express cars in the United States on Jan. 1, 1887, and 26,415 locomotives, most of which were, of course, used in freight service.

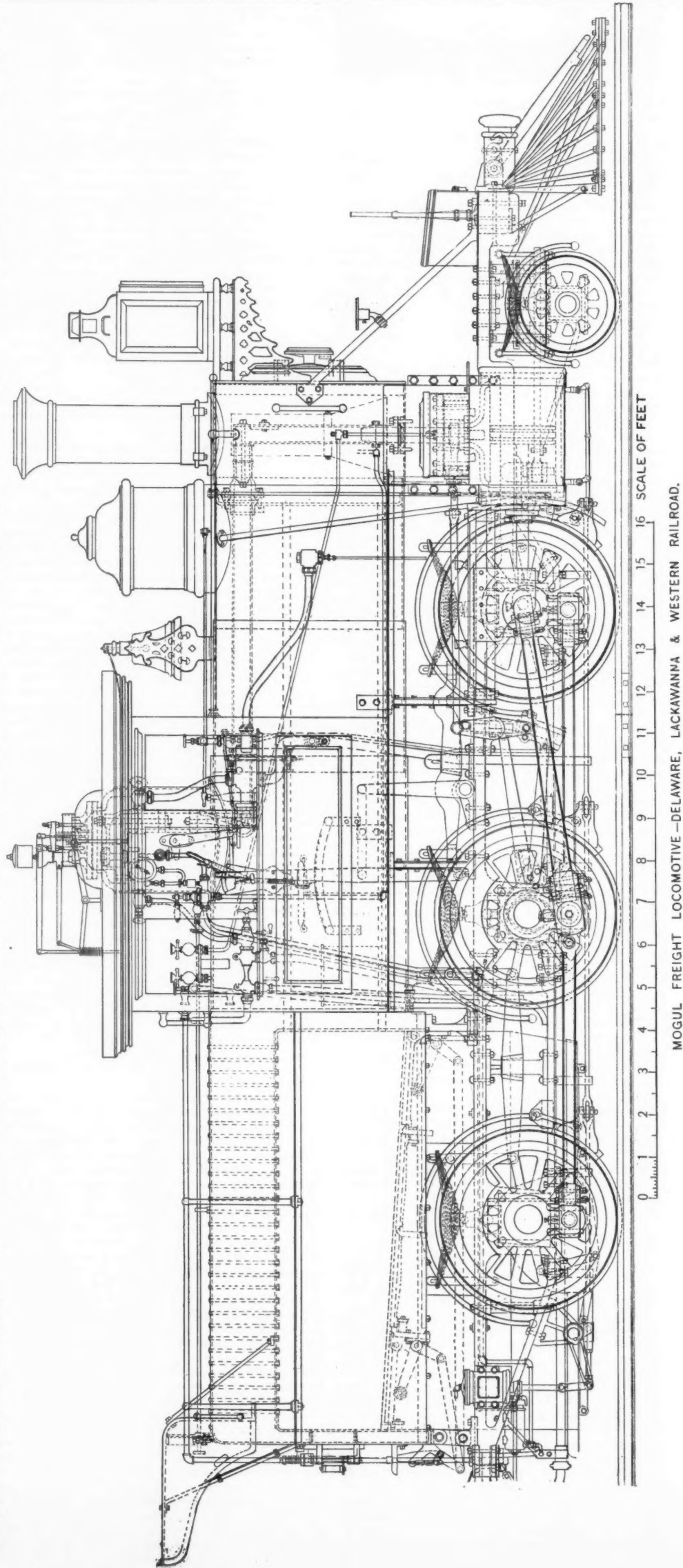
It has been calculated that the passenger cars in Europe fitted with continuous brakes would accommodate 3,000,000 passengers and their baggage, and would, with the locomotives fitted, form a train over 700 miles long.

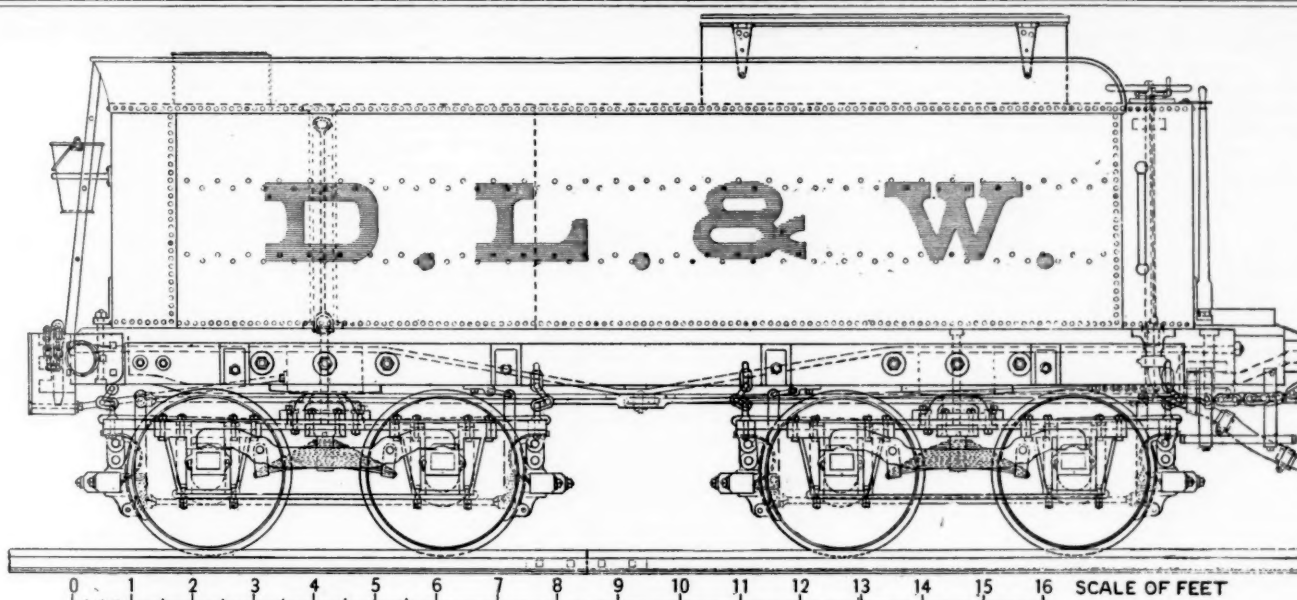
#### Mogul Freight Locomotive.—Delaware, Lackawanna & Western Railroad.

The accompanying engraving represents a Mogul engine, designed and constructed by Mr. Chas. Graham, Jr., general foreman of the Delaware, Lackawanna & Western shops, at Kingston, Pa., under the immediate supervision of Mr. Chas. Graham, general master mechanic, Scranton, Pa.

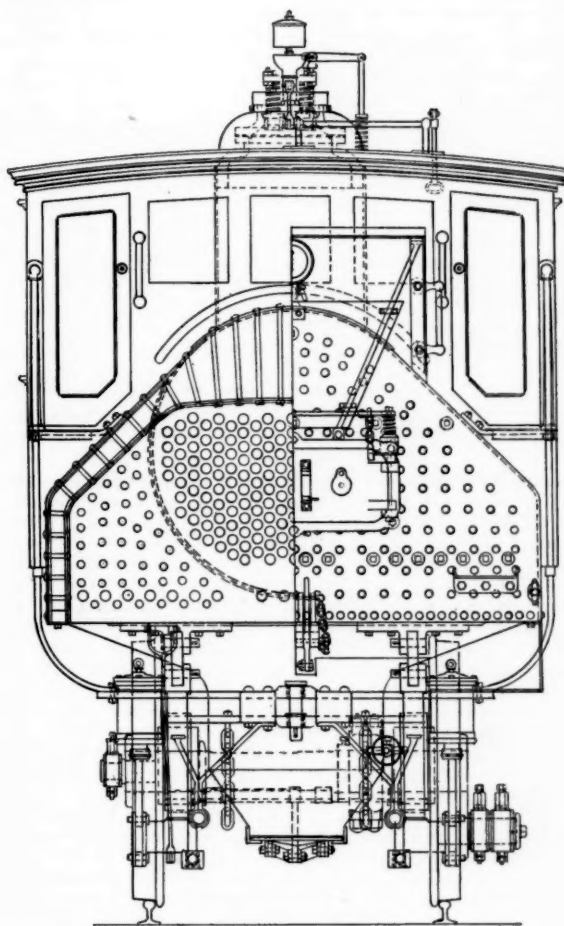
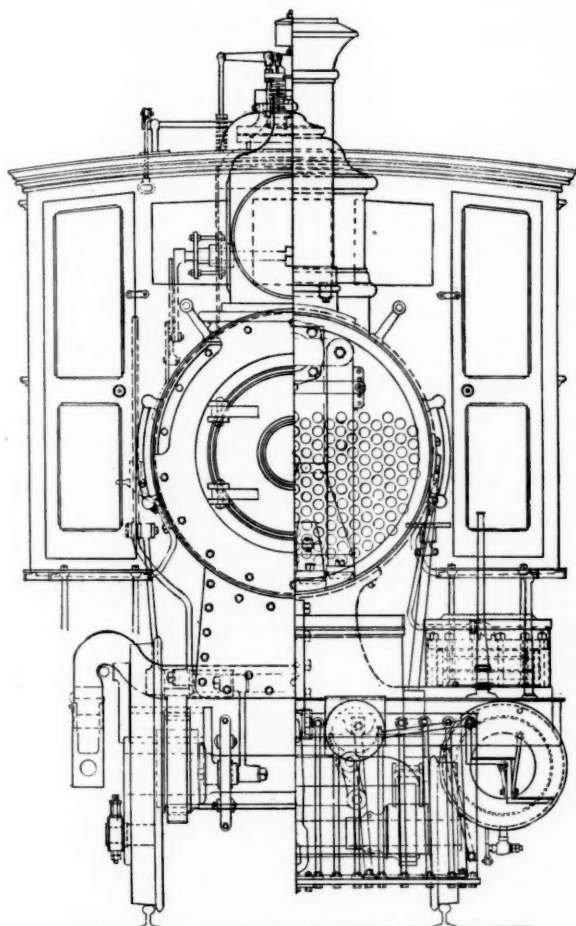
As will be seen from the engravings, the fire-box is placed completely above the wheels and is of considerable width, giving a large grate area for the combustion of small anthracite coal. It differs from the Wooten fire-box in having no bridge or combustion chamber. The front inside throat sheet extends straight up to the crown, forming the back flue sheet. Crown bars are dispensed with, the crown sheet being stayed by bolts having a copper washer and nuts on under side of crown sheet.

This class of engine, of which a number are in use on the Delaware, Lackawanna & Western, is giving remarkable service both as to steaming quality and economy in the use of small or inferior fuel (buckwheat or pea coal being used). From data furnished by comparative performance of engine





Tender for Mogul Freight Locomotive.



MOGUL FREIGHT LOCOMOTIVE—DELAWARE, LACKAWANNA &amp; WESTERN RAILROAD.

of this class and engines having long and narrow fire-box, both doing the same work, the cost per mile for fuel for the former using buckwheat coal was but 1.2 cents per mile, while the latter using lump coal showed a cost of 5.4 cents per mile.

The spring buffer, which forms one of the novel features about the engine, is shown in detail in our engravings. Two of these buffers are placed on the front bumper beam, and take the place of dead blocks. These buffers are cast iron, the sockets being bolted to the wooden bumper, and the plunger inserted, a spiral spring behind the plunger makes the buffer elastic, thus greatly relieving the shock and jar to the engine when drilling cars coupled to the front of the engine.

The first of these spring buffers was applied in 1878 to a six coupled double ender switching engine. The buffers have given great satisfaction, and seldom break, except in collisions, and have been applied to 15 engines built at the Kingston shops.

The buffers are cheaply and easily made and fitted up. After the castings are made, the socket is bored out to the required diameter, then the buffer is made to fit in loosely. A spiral spring is then put in the socket and a plate on top of it. The buffer is then inserted in the socket and pressure put on it to compress the spring a little, then a hole is drilled through for a bolt to hold the buffer in place. The hole in the buffer is elongated so as to allow for enough compression on the spring so that the head of the buffer will strike against the socket before the spring is compressed together solid.

The spring buffer was first adopted by Mr. Chas. Graham,

of Scranton, Pa., General Master Mechanic of the road, who was previously located at Kingston, Pa.

The American Steam Brake Co.'s improved driver and tender brake is shown and is now in use on a number of engines on this road, and is said to give general satisfaction, and work admirably.

The engine is equipped with two injectors, one No. 8 Mack and one No. 9 Sellers, both being placed on the right hand side of the engine.

The reverse lever quadrant is graduated on each 2 in. of cut off.

The engines has double nozzles, each 3 3/4 in. inside diameter.

The guide bars are made of cast iron. The cross heads are steel, with cast-iron gibs babbitted.

Some of the principal dimensions of the engine are as follows:

<b>Cylinders:</b>	
Diameter and stroke.....	19 in. by 24 in.
Distance apart from centre to centre.....	82 1/2 in.
Slide valve maximum travel.....	5 in.
" " lap (outside).....	3 1/2 in.
" " lead (at full stroke).....	3/8 in.
<b>Wheels, cast centres dia.</b>	45 in.
All flange tires, width and thickness.....	5 1/4 in. and 3 1/2 in.
Length of driving wheel base.....	14 ft. 6 in.
Total length of " of engine.....	21 ft. 9 in.
Total wheel base of engine and tender.....	46 ft.
Driving axles (Otis steel) dia. and length of journal.....	8 in. dia. and 8 in. long.
Engine truck axles (iron), dia. and length of journal.....	5 in. dia. and 8 in. long.
Tender truck axles (iron), dia. and length of journal.....	3 1/2 in. dia. and 7 in. long.
Engine truck wheels cast centres with steel tires.	

**Boiler, straight top (Otis steel), all horizontal seams lapped, with double row of rivets and welt inside barrel, length and dia. ....** 12 ft. 4 1/2 in. and 54 1/2 in.

**Thickness of plate (except dome course 3/8 in.)....** 7/8 in.

**Height of centre from rail.....** 7 ft. 4 1/2 in.

**" of top from rail.....** 9 ft. 8 in.

**" from rail to top of stack.....** 14 ft. 10 in.

**Fire-box, Otis steel:**

**Length inside.....** 114 in.

**Width inside.....** 90 in.

**Tubes, semi-steel:**

**Number.....** 194.

**Length.....** 149 1/2 in.

**Diameter (external).....** 2 in.

**Heating surface:**

**Tubes (external).....** 1,257 sq. ft.

**Fire-box.....** 135 sq. ft.

**Total.....** 1,392 sq. ft.

**Grate area.....** 71.25 sq. ft.

**Weight in working order.....** 98,000 lbs.

**on driving wheels.....** 87,000 lbs.

**Working pressure, 130 lbs. per sq. in.**

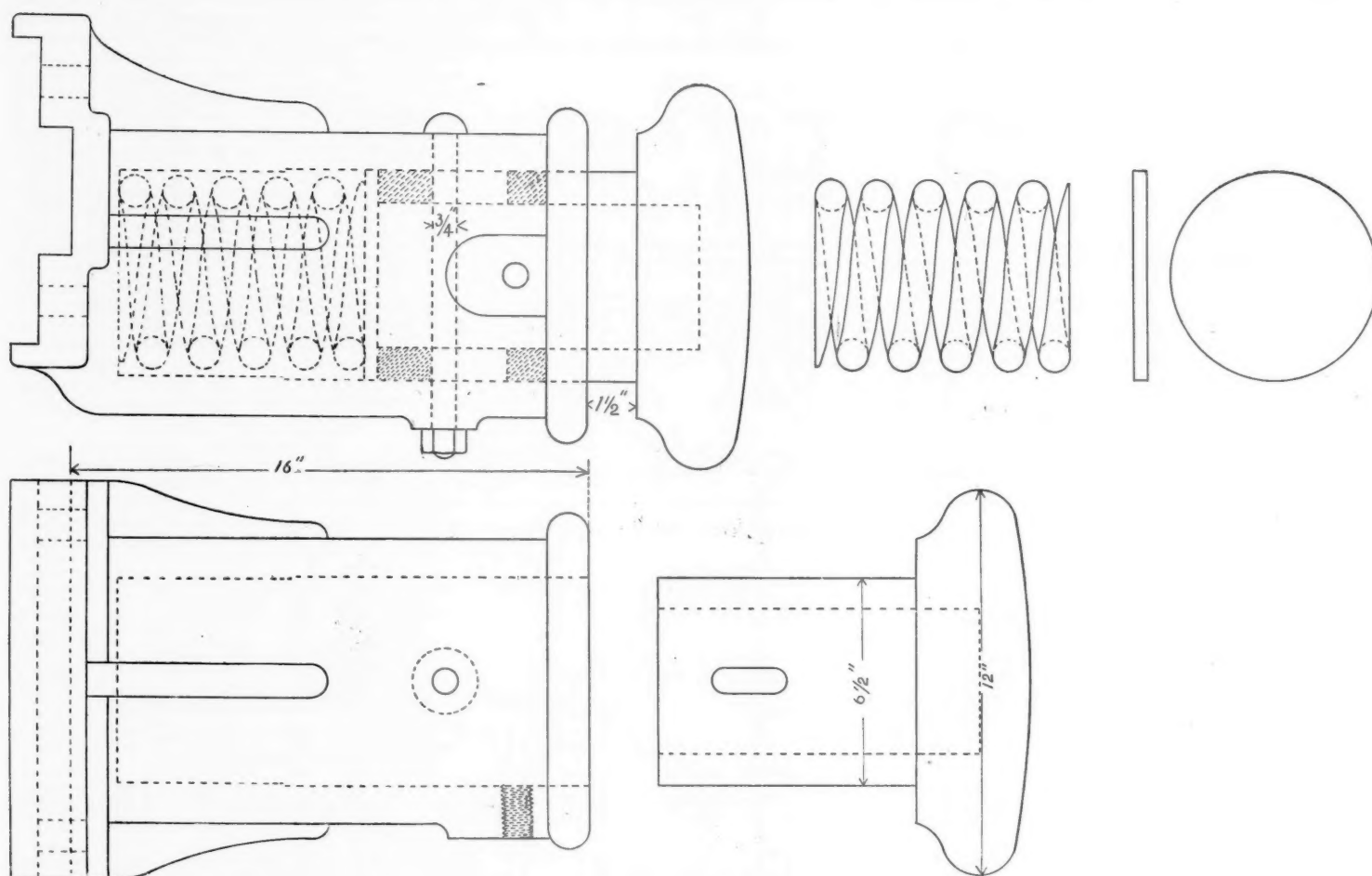
**Capacity of tank, 3,000 gallons.**

#### The Stampede Switchback, Cascade Division, Northern Pacific Railroad.

By H. S. HUSON, Principal Assistant Engineer.

(In the *Railroad Gazette* of Dec. 23, 1887, was published a plan and profiles of the Stampede Pass switchback and of a portion of the main line of the Northern Pacific, over the Cascade Mountains. In our issue of Jan. 13 the method of working trains over the switchback was described. These papers were from notes obtained from General Anderson, Chief Engineer, and Mr. T. F. Oakes, Vice-President and General Manager. Since their publication we have received





Buffer on Freight Locomotive—Delaware, Lackawanna &amp; Western Railroad.

(For description see page 66.)

a more complete account of this remarkable piece of railroad engineering and operation from Mr. H. S. Huson, Principal Assistant Engineer, and we print here such parts of his contribution as have not been sufficiently covered in the previous papers.]

The Northern Pacific Railroad made its first through connection with the Pacific coast in 1883 by joining the Oregon Railway & Navigation Co.'s line at Wallula, 214 miles east of Portland, Oregon. It held a charter to construct a line across the Cascade Mountains to Tacoma, on Puget Sound. Pasco, situated 17 miles east of Wallula, was selected as the point from which this branch, called the Cascade Division, was to diverge. For various reasons, chiefly financial, construction progressed in a desultory manner until the beginning of 1886, when it was decided to push the division to as speedy a completion as possible. Jan. 21, 1886, the contract was let for the construction of the tunnel through the main divide of the Cascade Mountains. This tunnel is 9,850 ft. long, and the time allowed for its completion was 28 months from date of contract. June 1, following, contracts were let to complete the road from each end of the division to the approaches of the tunnel. At this time the end of the track on the east end was 125 miles west from Pasco, and on the west end it was 50 miles from Tacoma.

At the same time a contract was let for the construction of a switchback. By this means the road could be opened for traffic a year earlier than the completion of the tunnel would otherwise permit. This was made desirable because of the attitude of the Oregon Railway & Navigation Co., which was taking advantage of two eastern connections to insist upon having an undue portion of through rates. There was also the consideration that the probable traffic receipts arising from the operation of this branch would assist in paying a portion of the fixed charges arising from its construction, which upon so long a division amounted to a considerable sum, and the property was practically unremunerative until it could be operated as a through line. Then there was the further consideration that the development of Eastern and Western Washington was largely dependent upon the completion of this branch. The extraordinary growth in population and the increase in the industries of both sections of the territory during the past summer have equaled the expectations of the company in this regard. The products of Eastern Washington being agricultural, mostly wheat, and those of Western Washington, coal and timber, the interchange between the two sections for the first half year have been very considerable, and the gain of this year's time will be a large increment in the future traffic of the road.

When the tunnel is completed the division will be 254.6 miles long; via the switchback it is now 258.7 miles, or 4.1 miles longer. The switchback, however, is 7 miles long exclusive of the tails. The distance by the main line through the tunnel, between the point where the switchback departs on the east side, and where it connects on the west side of the range, is 2.9 miles. The distance from Pasco to the east end of

the switchback is 174.1 miles, from Tacoma to the west end of the switchback it is 77.6 miles. The tunnel is approached by 6 miles of 116 foot grade upon the east side, and 8 miles upon the west side; so that when the tunnel is completed there will be but 14 miles of mountain grade. Through the tunnel there is 5,000 ft. of 0.2 per cent. ascending grade from the east portal towards the centre for drainage, and 5,000 ft. of 0.74 per cent. descending from the centre to the west portal, for the same purpose. From Pasco to the foot of the east side steep grade the maximum grade is 42 ft. per mile; from Tacoma to the foot of the west side steep grade the maximum is 66 ft. per mile. I have given the reader the foregoing descriptive account of the Cascade Division, that he may more fully understand the conditions of which the switchback may be regarded as supplementary.

The engineers had, from the first, considered a temporary switchback over the mountain. Various preliminary surveys had been made, from which it was ascertained that a switchback could be obtained. In the course of these surveys, various gradients had been discussed. There was an elevation of about 850 ft. above the tunnel to overcome. At one time a survey for a 4 per cent. overhead line was made, but when it was decided to build the tunnel immediately, it was evident that it was cheaper to use a higher rate of grade, thereby materially shortening the length of the switchback, and reducing the cost of its construction, as it was certain that the increased expense of operating the steep grade for a single year would not equal the saving in original cost by thus shortening the length of the temporary line. It was therefore determined to locate upon as nearly a 6 per cent. grade, as should prove expedient from the nature of the ground.

#### LOCATION.

The deep snows of the winter did not recede sufficiently to permit the locating party to begin the work until June 14. It will be remembered that the contract for this work was let on June 1. Simultaneously with the engineers, the contractors were establishing camps and moving in their plant preparatory to active operations, and before the close of June the work of clearing and grading had begun. The location was made with a single party under the direction of a young engineer, Mr. J. Q. Barlow. The mountain is very rugged and heavily timbered. By reference to the map [page 824, Vol. 1887] it will be seen that in order to get the necessary distance without increasing the number of switches it was necessary in several cases to describe almost a figure 8 with the line. The developments of distance were secured by following up a ravine toward the head, then describing almost a complete circle and crossing the same ravine upon a trestle lower down. To find opportunity for doing this upon the steep side of a mountain requires both skill and boldness as an engineer. The location was completed on the 12th day of July, and by the time the location was completed four miles of the line had been staked out by the same party and was under construction.

The method of locating is that commonly practiced by experienced mountain engineers. An angle line is first run following close to what the engineer believes will be the final location. From this angle line other short lines are run out laterally. From these angle lines taken as a base, contour lines are carefully traced out. The notes are reduced to a map upon a large scale. The engineer then proceeds to trace his grade line upon the map. A pencil projection is then made, following the grade line as closely as practicable. Notes of this projection having been obtained the party proceeds to run the line in the field. By this means but little unnecessary country is developed and the fewest possible number of preliminary lines are run. In a heavily timbered country this is a great saving, and if the work is well done, but little shifting will be necessary to make the line fit the ground.

Having obtained the necessary topography for this projected location upon the east side, the engineer proceeded to make his location, confident that as fast as half a mile of line was run he could with safety permit the contractor to follow up with his clearing and grading. The same method of procedure prevailed upon the west side.

In making the location it was found necessary to make but one switchback on the east side, but as it was necessary to make two on the west side, another switchback close to the east portal of the tunnel was added to the east side location, in order to avoid having the switchbacks act as a Y and turn every train in passing over.

The total elevation to overcome on the east side was 850.36 ft. This was done by means of a maximum grade of 5.6 per cent., or 293 ft. per mile. The average rate, after equating for curvature, is 4.952 per cent. The elevation to overcome on the west side was 945.22 ft. This was done by means of a 5.2 per cent. maximum grade, or 275 ft. per mile. The average grade, after equating for curvature, was 4.05 per cent. The elevation of grade upon the summit is 3,660 ft. above sea level; the elevation of the pass is 3,700 ft.—a cut of 40 ft. for the roadway. Five hundred feet of level grade was laid across the summit, part to be used in rounding off the adjacent grades, part to serve as a level piece of road for trains to stand on. A summit spur, 1,300 ft. long, on a level grade, was made along the side of the ridge for use in switching and setting out cars.

Fourteen degree curves are the maximum on the east side, and 15 degree curves the maximum on the west side. The equation for curvature was at the rate of .04 per station for each degree of curvature. The tables below may not be wanting in interest to the reader.

The tables for elevation of curvature and gauge of track were computed with reference to adaptability for use of the "Decapod" locomotives.

At each one of the four points where switchbacks occur, a spur or "tail" was produced, 575 feet beyond the head-block of the switch forming the connection. This spur was calculated to hold 2 decapod engines and 7 passenger coaches, or 2 decapod engines and 14 freight cars. The



ELEVATIONS FOR CURVATURE—SPEED 20 MILES PER HOUR.

Degree of curvature	Raise outer rail in decimal foot.	Lower inner rail in decimal foot.	Difference in elevation of rails.	
			In decimal foot.	In inches.
1 to 3	0.04	0.04	0.08	1
4	0.05	0.05	0.10	1 3-16
5	0.06	0.06	0.12	1 7-16
6	0.07	0.07	0.14	1 11-16
7	0.08	0.08	0.16	1 15-16
8	0.09	0.09	0.18	2 3-16
9	0.11	0.10	0.21	2 1-8
10	0.12	0.11	0.23	2 1-4
11	0.13	0.12	0.25	2 1-2
12	0.14	0.13	0.27	2 3-8
13	0.15	0.15	0.30	3 1-16
14	0.16	0.16	0.32	3 1-8
15	0.17	0.16	0.31	3 1-4

GAUGE OF TRACK.

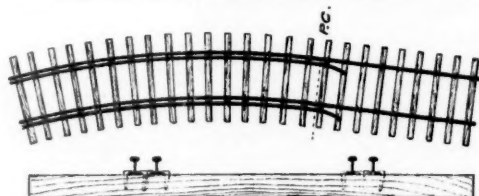
Degree of curvature.	Gauge of track.
5	4' 8 1/2"
6	4' 8 13-16"
7	4' 8 3/4"
8	4' 8 15-16"
10	4' 9 1-16"
12 and 13	4' 9 1/4"
14 and 15	4' 9 1/2"

spurs were located upon an ascending grade of 2.5 per cent. and joined to the descending and ascending grades with vertical curves. The end of the spur is made to butt up against a heavy excavation, to take the place of bunting posts. Thus they are made to act as safety spurs in checking the speed of a train descending, and where the train is passing up the mountain the adverse grade gives it a good start. Where trains are passing down the mountain, the lighter grade of the spur enables the men to get the train under perfect control in starting.

## LOCOMOTIVES AND TRACK.

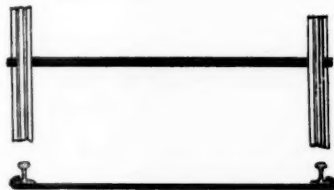
Directly upon its being decided to construct the switchback, two heavy decapod locomotives were ordered from the Baldwin Locomotive Works. [The dimensions were given in our issue of Dec. 23, 1887.—Ed.]

The driving-wheel base of the decapod engine is 17 ft., and it was at first supposed that the middle ordinate of this chord upon curves of 15° would not be sufficient to prevent the blind drivers from getting full traction on the rail. In actual trial, however, it was discovered that in connection with the increased gauge for curvature, the blind drivers did not only not get the full bearing on the rail, but that where the track was faulty, or the drivers slipped, the rail would be crowded over and the drivers become derailed. To obvi-



ate this a fourth rail was laid as illustrated in the accompanying sketch. This fourth rail was first laid on curves of 14° and 15°. It was afterwards extended to all curves of 10° and upwards, in order that no accident should occur from this cause by reason of faulty or spreading rails.

The motive power being so very heavy, there was a great strain thrown on the track, and the utmost vigilance was required to keep the track from spreading, particularly on curves. When the track was first laid we used a 7 1/4 lb. rail brace, two at each joint, and one at the halves and quarters of each rail. But even this precaution was not found sufficient to keep the track from spreading. Accordingly, a bridle brace was used on all curves. The accompanying sketch will illustrate its shape.



This brace is so constructed that it is very easy to put in place. Two were used on each joint, and one on the halves and quarters as was found necessary. They were made in lengths corresponding to the gauge of the track at the point where they were to be used. No further trouble has been caused by the spreading of the track where these braces have been placed.

When the decapod engines first arrived they had but one sand box, designed for use when the engine was in the forward motion. As the engine had to back up half the time, it was just as important to have sand provided for the backward motion. Accordingly, an additional sand box was placed on each engine, with pipes leading to the rear of the hind drivers.

The decapod engines are provided with the usual automatic air brake contrivances, with hose couplings arranged to connect with the train whether at the rear or in front of the locomotive. The engine itself is provided with the usual steam driver brakes, and in addition the latest improved water brake. While descending a grade the water brake is always used, as it is the most effective of any of the brakes, and is the least expensive, there being no wear of brake shoes. Of course straight air brakes are used at the same time on the train, usually with 10 lbs. pressure set, the en-

gineer turning on as much more as may be necessary to keep the train under control. In cases of emergency, the steam driver brake is used. In addition to these of course there is also the reverse motion of the engine, which may be considered as a brake if needed. All these precautions make the movement of trains very safe. In addition to the two decapods, two consolidation engines, weighing 173,000 lbs. each, when coaled and watered, have been called into use upon the switchback. They are similarly provided with sand boxes and brakes. These four engines are all that are used in the regular service.

[The loads hauled and the method of train running over the switchback were given in our issue of Jan. 13, 1888, from the notes of Mr. Oakes. At the summit a short halt is made where the automatic is changed to straight air, all wheels are sounded, and brakes examined and tested. The schedule time for passing over the switchback is 1 hour and 15 minutes.—Ed.]

During September nearly 1,900 cars were transported over the switchback. I do not know that the operating department has had occasion to find out the greatest number of cars that can be transported in a day. They have thus far been able to transport everything that has been presented, without operating it to its fullest capacity. A tabulated statement of the cost of conducting transportation and maintenance of way would be very interesting, but as it is a matter that strictly belongs to the operating department, I do not feel at liberty to publish it in this article.

Track was connected June 2, 1887, just 11 months and 18 days after the engineers began work. The road was operated by the construction department until July 3, when it was turned over to the operating department. During the time it was in my hands, I operated it under practically the same rules which now govern its operation, of course varying as the needs of construction required. From the time tracks were connected until it was turned over, all the heavy freight to and from Puget Sound passed over the switchback. Through passenger trains, however, were not put on until July 3.

Of course such a work could not be constructed without considerable cost. In its construction every device was used to cheapen the work, at the same time taking care that the roadbed should be of the utmost solidity and strength. I have before remarked upon the heavy growth of timber with which the mountain is covered. Of course all trestling was very cheap. Wherever the original cost of building a trestle was less than making a fill, trestles were built. The line was located with special reference to avoid solid rock cuttings where practicable. Instead of retaining walls, log cribs were built to supply their place. These cribs were filled with earth and loose rock, and very largely reduced the amount of material necessary to be moved to make the road bed. Below I give an estimate of the amount of material moved in its construction.

Clearing, heavy timber, acres	94.54
Excavation, solid rock, cu. yds.	68,181
" loose rock cu. yds.	15,558
" cement gravel, cu. yds.	47,683
" earth, cu. yds.	37,142
Grubbing, stations	251
Extra haul, cu. yds.	1,548
Rip rap in place, cu. yds.	225
Bridging, sawed and hewn timber in structure, ft. B. M.	3,100,902
" plank in structure, ft. B. M.	237,802
Log culverts, lin. ft.	8,117
Crib work, logs in place, lin. ft.	161,835
Cross ties	17,004
Tracklaying (including spurs), miles	8.14
Blasting, cu. yds.	10,337

During the winter time the mountain is covered with heavy snow. The snow storms do not extend to the valleys below to any considerable extent, but on the mountain snow lies to the depth of nearly 10 ft. during the months of January and February. As a protection against this, snowsheds have been erected in all thorough cuts, and in some places where the line lies close to steep side hills. There are, however, neither signs nor possibility of snow slides occurring, the country is too heavily timbered for snow slides to get a start. The snow is very heavy and moist, as the temperature rarely falls to zero, usually remaining between 30 and 40 degrees Fahrenheit. The weight of this snow is something wonderful to witness. Buildings of ordinary strength collapse directly under its weight. The snowsheds have been erected with 10" x 12" posts, the caps spanning the track are 10" x 16", best quality of red fir. These bents are 4 ft. apart, and are covered with 4-in. plank; 3,362 lineal feet of these snowsheds have been erected. If the company depended upon the ordinary snow plows, it is probable there would be difficulty in keeping the switchback open in winter, as the snow is so wet that the common plow at any speed that could be attained with safety upon so steep a grade would not be able to throw the snow clear from the track. Under such circumstances it would push along in advance of the plow until it had packed to a consistency nearly that of ice. Two rotary steam snow shovels have been ordered for this purpose, and there is no doubt but that they will be able to master the snow under all circumstances which are likely to occur.

Upon the whole the switchback has been a success. It has accomplished everything that its promoters expected of it. Aside from this, on account of its novelty and the beauty of its scenery, it has been a great attraction to the tourist, exciting universal admiration. When the tunnel is completed the traveler may feel safer in passing through than in going over the mountain. I do not know that he will be any safer. He will certainly miss one of the finest mountain scenes to be observed from a car window upon any road.

Later on, when the Stampede Tunnel has been finished (and at the rate of present progress it will be completed on time, May 21, 1888), the members of the American Society of Civil Engineers will most likely have the benefit of a much more

scientific article than this upon the Stampede Tunnel and Switchback from the pen of Mr. V. G. Bogue, under whose direction they were laid out and construction work carried on until 13 months ago, when he resigned to take the position of Chief Engineer of the Union Pacific Railway.

## The Use of the Stadia in Railroad Surveying.

BY J. B. JOHNSON,

I.

It is proposed to show, in a few short articles, how the stadia rod may be advantageously introduced in preliminary railroad surveys. A knowledge of the theory will be assumed, since it is now accessible to all.\* The reader will also be assumed to be acquainted with the use of instruments and with the ordinary methods of railroad surveying.

The selection of a preliminary line for a railroad may be done in either of three ways:

1st. By trial lines, their profiles enabling the transit-man to continue his course, to shift it, or to back out and try again.

2d. By reconnaissance simply, the engineer having so good an eye for country, and a judgment resulting from so long a training, that he can at once lay out a line which is very nearly the best line.

3d. By a topographical map, on which the contours and principal natural features are accurately shown.

The first method requires little talent or experience, has been almost universally used in this country, is not likely to give the best line, and is in bad repute with the best locating engineers.

The second method is only possible in easy country for the average locating engineer, and in difficult country even the best locating engineer will probably fail to get the best line the ground affords. It is rapid, cheap and quite satisfactory in ordinary, rolling, open country, with a good man to do it.

The third method requires at least one expert topographical surveyor and draughtsman to handle the transit and do the plotting, the only reasonable method to use being that of the transit and stadia. With a good locating engineer it would only be used in difficult country, but with young or inexperienced engineers, or with those who have not the ability to locate by the second method, it could be very generally used with profit. The first method should, probably, always give place to the second and third, these to be used alternately along the line for the easy and difficult portions, respectively. The map location serves an excellent purpose in educating the engineer to do without it, being perhaps the best means in the world of cultivating his judgment to see contours on the ground. Where the view is obstructed also, by woods or shrubbery, the map enables the engineer to locate one part with reference to distant positions, which could not be studied in conjunction on the ground. In fact, few engineers will discredit the aid to location that may be had by a good contour map of the ground, the only objection being the cost and time required to obtain it. The object of the writer is to show that these maps may be obtained for certain portions of the line without any additional instruments or men and at so small a cost of time and money as to make this objection of no force.

## INSTRUMENTS.

The only instruments required for all purposes herein specified will be an ordinary field transit instrument with a vertical circle or arc, and two or three rods, which are at once stadia rods and level rods.

## The Transit.

The only change required in the transit is the insertion of two additional horizontal wires in the reticule, at such a distance apart as to make the space intercepted on the rod just one one-hundredth of the distance from the rod to the instrument. This distance can be accurately found for each instrument from the following relation:

$$\begin{aligned} \text{Let } i &= \text{dist. between cross wires.} \\ s &= \text{dist. intercepted on the rod.} \\ d &= \text{dist. of rod from instrument (plumb line).} \\ f &= \text{focal length of objective.} \\ c &= \text{dist. of objective from plumb line, extended.} \end{aligned}$$

$$\text{Then } i = \frac{fs}{d-(f+c)}$$

Now  $f$  is the distance from the plane of the cross-wires to the inner face of the objective for a stellar focus, or where the instrument is focussed on a distant point. When the instrument is so focussed this distance can be taken off by a pair of dividers with sufficient accuracy, having first examined to find the relation between the plane of the wires and the centre of the reticule adjusting screws, and also the position of the interior face of the objective with reference to the extreme end of the telescope. The distances  $s$  and  $d$  should be about an average of the readings to be taken in actual work, say  $d = 400$  ft., and  $s = 4$  ft. The distance  $c$  is the distance from the centre of the instrument to the outer face of the objective and may be measured directly. The distance  $f + c$  will be about 12 to 14 in. in ordinary field transits. If  $f + c = 1.1$  ft.,  $d = 400$  ft.,  $s = 4$  ft.;

$$\text{then } i = \frac{fs}{99.725} \text{ ft.}$$

$$\text{If } f = 0.725 \text{ ft., then } i = 0.00727 \text{ ft.} = 0.09124 \text{ in.}$$

This is to be the distance between the two extreme horizontal wires. The relative error made in this distance will give the same relative error in the relation between the distance to the rod and the space intercepted on it. And since we wish to use a level rod as a stadia rod, this relation must

\* See especially "Topographical Surveying by the Transit and Stadia," and also "Theory and Practice of Surveying," by the writer. John Wiley & Sons, New York.

be just 1 to 100 as a matter of convenience. That is, we cannot make a diagram now to fit the wires, but must set the wires to suit the rod.

Although any careful person could set these wires to within, say, two per cent., of their true place, it is best to mount them on an adjustable frame, such as most makers can furnish, and then adjust them to intercept the required distance on an average length of sight. If one has not had experience in the setting of cross wires, it would be best to have this done by the makers.

A *gradiometer screw* may be made to serve the purposes of stadia wires, but it is less accurate and rapid than the fixed wires, and hence, if much work is to be done, the fixed wires should be provided.

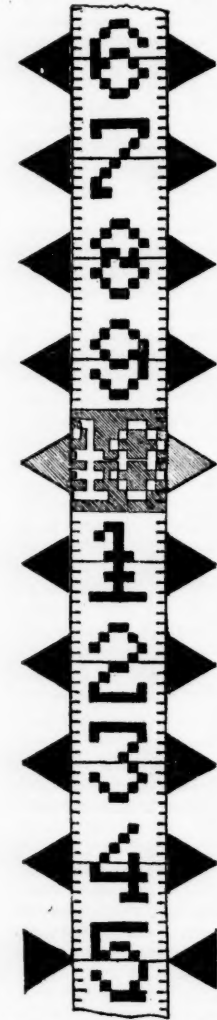
#### The Rod.

Since we wish to use the same rods as stadia and as level rods, it is important to use a design well adapted to both purposes.

As a level rod it must be easily read to single hundredths or to thousandths if desired, and hence the smallest graduations must be hundredths of a foot. On the other hand, for stadia purposes, it must read on near sights to single feet in distance (hundredths on the rod), and on long sights, where these small graduations will be invisible, it must still give distinct readings to single feet in distance if desired. The different feet and tenths must also be indicated, and the rod must be small.

The rod should be a plain pine stick, about 0.2 ft. wide and say 1½ in. thick. The length may be as much as 16 ft. if desired. It should be painted white, and mounted with a metal plate on the bottom.

The accompanying design is well adapted to answer all these requirements. It is a modification of a design long used by Mr. Benj. S. Lyman, of Northampton, Mass., for both levels and for stadia purposes. The central part is Mr. Lyman's, and was given to the readers of the *Railroad Gazette* in the issue of Feb. 12, 1886. The side points have been added by the writer to make it legible at long distances. The foot marks are in white on a red ground, the remaining figures being all black on a white ground. All these figures should be carefully laid out and painted in by a skillful hand to get the lines true and regular. At a distance nothing would show but the red foot marks and the black points at the sides, but these would be sufficient to enable one to read the distance to the nearest foot. The side points at the half-foot marks are turned in the opposite direction. The arrangement of figures as given is for an inverting telescope, in which case they would be painted on the rod in the reverse order from that here shown. The figure is here turned wrong end up for the convenience of the reader.



for the convenience of the reader.

Two or three such rods should be provided for one transit. These may serve either as level rods or as flag poles when not in use as stadia rods.

#### A Highway Bridge in Kansas.

KANSAS CITY, Jan. 17, 1888.

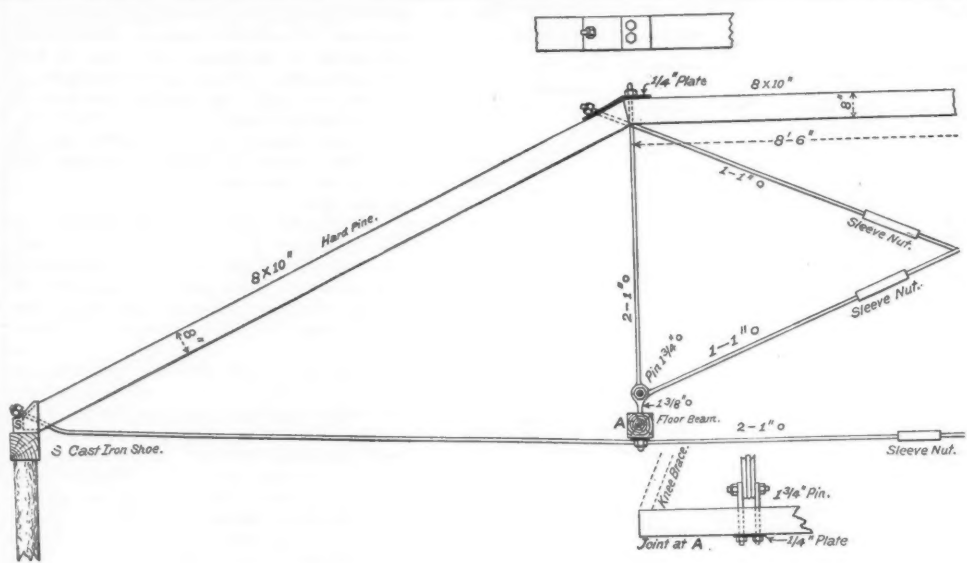
TO THE EDITOR OF THE RAILROAD GAZETTE:

A correspondent of mine residing at Newton, Kan., has sent me the accompanying sketch of a combination highway bridge. It was intended for my pamphlet on "General Specifications for Highway Bridges of Iron and Steel," but has come too late. Knowing that you are interested in the reform of the present practice of designing highway bridges, I send it on to you for publication.

My correspondent writes as follows: "Herewith inclosed find sketch of semi-truss, which spans Sand Creek, just west of this city. If in your search for faulty constructions you find one that will eclipse this, it will have to be a good one."

"This is a part of a three span bridge, each truss being like the one herewith represented, and of the same dimensions—50 ft. long and about 18 ft. wide, with fellow guard in the middle of the bridge and deck of ordinary construction. Screw ends of rods are in no case upset; screw threads are 8 to the inch, which reduces the sections materially. This bridge was built about 18 months ago by a 'professional bridge builder' who makes his headquarters here. Many of his small queen-post trusses through this county have no diagonals whatever."

"This bridge is on one of the leading arteries of wagon



A HIGHWAY BRIDGE IN KANSAS.

travel in and out of this city. It carries all the fair traffic in fair times. The west span went down under a small bunch of cattle not two months after construction, just how many head I could not learn. The same builder was at once employed by the county commissioner to rebuild it."

I would like to call the attention of your readers to the beautiful curve in the lower chord rods where they connect with the shoe. It is true that such a curve vitiates the results of all stress calculations, but that is of no importance when the great convenience of the detail is considered. The edge-bearing of the nut makes the calculation of fibre stress at the root of the thread somewhat difficult, so I shall not attempt to tell you exactly to what extent the iron of the bottom chord is strained. Omitting from consideration the curve in chord rods and the edge-bearing of the nuts, and assuming that the live and dead loads combined amount to only 1,440 lbs. per lin. ft. on both trusses (light enough in all conscience!), we find that the bottom chord stress on one truss is about 23,300 lbs., and the intensity of working stress at the root of the thread about 26,400 lbs. The chances are that this iron is of inferior quality, and that the working tensile stress is in excess of the elastic limit. How long this structure will stand up it is difficult to say; but I imagine that the people of Newton and vicinity will find it safer to ford the stream than to drive over the bridge.

J. A. L. WADDELL.

#### Wear of Rails on German Railroads.

The results of observations made in Germany during the years 1879 to 1884 on the amount of wear of rails have been made public by the Union of German Railway Directions. The average results obtained for the different sections of road under observation on different grades and curves are shown in a condensed form in the following tables:

##### Single Track Road, Rails on Cross-ties.

Decrease in height of rail. Average for each million tons gross traffic.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0035	.0052	.0356	.0124	.0056
From 1.74 to 2.91.....	.0042	.0048	.0064	.0124	.....
From 2.91 to 4.34.....	.0040	.0058	.0060	.0048	.0056
From 4.34 to 5.82.....	.0003	.0036	.0076	.0142	.0116
From 5.82 to 8.76.....	.....	.0060	.0088	.0204	.0068

The wear, as shown by decrease in the section of the rail, is given in the following table.

##### Single Track Road, Cross Ties.

Average decrease in the section of rails for each million tons gross traffic.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0063	.0084	.0104	.0224	.0154
From 1.74 to 2.91.....	.0083	.0064	.0115	.0266	.....
From 2.91 to 4.34.....	.0082	.0082	.0115	.0163	.0136
From 4.34 to 5.82.....	.0089	.0092	.0177	.0173	.0307
From 5.82 to 8.76.....	.....	.0197	.0177	.0360	.0206

##### Double Track, Rails on Cross-ties.

Decrease in height for each million tons gross traffic.

##### UP-GRADE TRACK.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0019	.0024	.0072	.0068	.0036
From 1.74 to 2.91.....	.0024	.0032	.....	.....	.....
From 2.91 to 4.34.....	.0036	.0056	.....	.....	.....
From 4.34 to 5.82.....	.....	.0024	.....	.....	.0020
From 5.82 to 8.76.....	.....	.....	.....	.0064	.....

##### Double Track, Rails on Cross-ties.

Decrease in height for each million tons traffic.

##### DOWN-GRADE TRACK.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0028	.0048	.0140	.0100	.0176
From 1.74 to 2.91.....	.0072	.0036	.....	.0000	.....
From 2.91 to 4.34.....	.0072	.0040	.....	.0084	.....
From 4.34 to 5.82.....	.....	.0052	.0152	.0080	.0172
From 5.82 to 8.76.....	.....	.0040	.....	.....	.0168
Over 8.76.....	.....	.....	.....	.0088	.....

##### Double Track, Cross-ties.

Average decrease in section of rails for each million tons gross traffic.

##### UP-HILL TRACK.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0029	.0035	.0132	.0132	.0077
From 1.74 to 2.91.....	.0060	.0048	.....	.....	.....
From 2.91 to 4.34.....	.0075	.0078	.....	.....	.....
From 4.34 to 5.82.....	.....	.0040	.....	.....	.....
From 5.82 to 8.76.....	.....	.....	.....	.....	.0031
Over 8.76.....	.....	.....	.....	.0123	.....

##### Double Track, Cross-ties.

Average decrease in section of rails for each million tons gross traffic.

##### DOWN-GRADE TRACK.

DEGREE OF CURVATURE.	GRADE.				
	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Degrees.	Up to 1 p. c.	1 to 1½ p. c.	1½ to 2 p. c.	2 to 2½ p. c.	Over 2½ p. c.
Less than 1.74.....	.0049	.0087	.0258	.0206	.0299
From 1.74 to 2.91.....	.0058	.0060	.....	.0101	.....
From 2.91 to 4.34.....	.0155	.....	.....	.0143	.....
From 4.34 to 5.82.....	.....	.0091	.0230	.0135	.0274
From 5.82 to 8.76.....	.0115	.....	.....	.....	.0188
Over 8.76.....	.....	.....	.....	.0159	.....

#### Nevens' Flange Scraper.

The accompanying engravings represent an improved flange scraper, the invention of Mr. George Nevens, of Brunswick, Me., First Division Roadmaster on the Maine Central, on which line it has been adopted, after having given very satisfactory results in working.

A reference to the engravings will explain the mode of operation. The scraper sets diagonally across the rails, 3 in. broader than the gauge. The knife cuts 2½ in. deep, 15 in. wide inside of the rail and 7 in. outside, and it is claimed clearing and throwing out all snow and ice, making a clean and clear flange. Trains can then make schedule time, not having to contend with a choked flange, causing wheels to slip. The scraper is double, cutting whichever way the car is running, thereby dispensing with the necessity of turning the car. It is equally as well adapted for single as double track.

One end of the mold board (which curves outward), is higher than the other; the opposite side being the reverse. In operation the snow and ice is caught by the lower end and crowded along to the higher end, whence it is thrown in a continuous stream 20 ft. or more from the track, clearing all shoulders which snow may have formed, the distance to which the snow is thrown being dependent more or less on the speed of the train.

A reference to the engraving will show that the snow can be thrown either side if desired. This is of course essential on double track, or in case of a side drift where the snow can only be removed on one side.

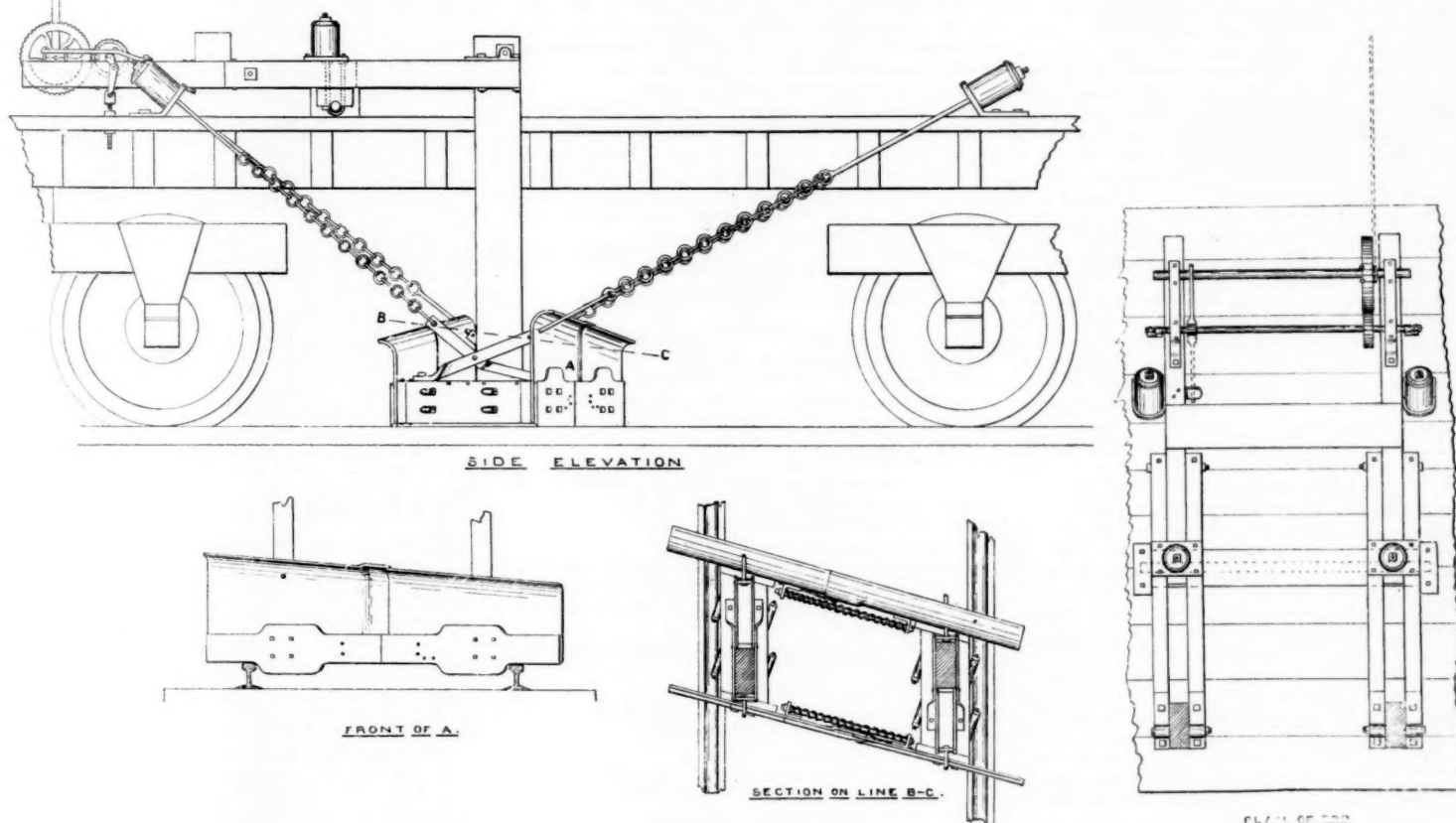
Should the flanger hit a frog or any kind of obstruction, causing the breaking of a supporting chain, it is so arranged



ferent destinations, making it necessary to reload freight or to forward it to each destination in quantities which did not utilize the carrying capacity of the cars. Under these conditions it is impossible to transport miscellaneous freight of this character as cheaply as full car-load freight, leaving out of consideration the additional cost of handling miscellaneous freight at receiving and delivery stations.

Mr. Fink submitted a carefully prepared estimate of the

tons, assuming each car to be loaded with  $5\frac{1}{2}$  tons of freight, the cars weighing 11 tons, would be  $\frac{637.5}{16.5} = 38$  cars, and the number of net tons carried in this train would be  $38 \times 5.5 = 209$  tons, and the relative proportion of net weight to gross weight would be as 209 to 637.5, or as 1 to 3.05. For every ton of net weight there has to be carried on account of L. C. L. freight, 3 tons of gross weight; hence



THE NEVENS SNOW FLANGER—MAINE CENTRAL RAILROAD.

as to let it practically jack-knife together, thereby letting it by, avoiding all danger of its spreading the rails, as would be the case were it rigid. The mold boards are in two parts and are fitted with a sleeve with a spiral spring on the back of each mold board so as to adjust the resistance and enable the flanger to yield when it strikes an obstruction.

The flanger is raised and lowered by means of the lever on the frame, which can be operated very easily by one man. It is claimed that the flanger can be run with perfect safety 30 or 35 miles per hour.

Any further information can be obtained of the inventor or of Mr. A. A. White, Portland, Me.

#### Relative Cost of Transporting Car-Load and Less than Car-Load Freight.

Among the witnesses called in the hearing last week before the Inter-state Commissioners in the Car-Load Lot Case was Mr. Albert Fink. The substance of the complaint is, it will be remembered, that the trunk lines have unjustly discriminated against shippers of small quantities by making the rates for quantities less than car-loads too high in proportion to the rates for similar articles in car-load lots. What difference the railroads may properly make must depend to some degree upon the relative cost of transportation, although this will probably not be admitted as the final and determining element in settling the question. Very little information has ever been published on the cost of transporting freight between local stations, and the results which Mr. Fink has here collected of the observations made on the Erie and the Pennsylvania, and which confirm the conclusions at which he arrived in 1873-4, will have permanent value long after the question which called them out is settled.

Mr. Fink submitted an estimate of the relative cost of transporting freight in car-load and less than car-load lots, which was based upon statistics which had been carefully prepared, showing the average loading of C. L. freight, and the average loading of L. C. L. freight, in some 7,000 cars shipped from New York by the different trunk lines at various times. The average weight of C. L. freight was about 29,000 lbs. per car, while the L. C. L. freight averaged about 10,000 lbs. per car. He pointed out the distinctive character of C. L. and L. C. L. freight. In the case of C. L. freight there is a guarantee given by the shipper of a certain amount of freight, from 20,000 to 24,000 lbs., to be delivered in one day, directed to one destination and one consignee, thereby giving an assurance to the railroad company that the full capacity of the car will be utilized, while L. C. L. freight is delivered in small quantities, without any such guarantee, consigned to a great many destinations; the railroad companies have to take the risk of sending cars over their roads only partially loaded. The statement showed that the average weight of one consignment of miscellaneous freight was 723 lbs., the average number of consignments in each car varying on the several roads from 8.3 to 25.7, and that on an average there was in each car freight for from 3 to 7.3 dif-

relative cost of transporting C. L. and L. C. L. freight, based upon the data obtained; and the following is an abstract of his testimony in regard to that subject:

In order to ascertain the cost of transporting any particular class of freight, and to institute a comparison between the cost of one class and another, it becomes necessary to first ascertain the gross weight which has to be moved on account of the net weight. By "gross weight" is to be understood the weight of the freight to be transported, plus the weight of the cars in which it is transported. The cost of transportation is in proportion to the gross weight, and not in proportion to the net weight, understanding by the term "net weight" the weight of the paying freight on which the charges for transportation are made.

If the gross weight of a train, in tons, is known, and also the cost of running a train, including all expenses, we can ascertain, in the first place, the cost per gross ton. Having ascertained this, we then have to find how many tons of gross weight have to be carried on account of the net weight of the different classes and kind of freight, and charge the net weight with this cost, from which the cost per ton, or per ton-mile, of each class or kind of freight, may be ascertained.

The capacity of a locomotive—the number of cars it can haul—and the cost per train-mile, differ on every road or portion of a road, and it is, therefore, necessary to assume certain like conditions as a basis for comparison. It is not the intention to ascertain the actual cost on any particular road, but merely to make a comparison between the cost of transportation of different classes of freight under the same assumed conditions, corresponding, as nearly as practicable, to the average conditions under which the work is generally performed.

Applying this method to determining the relative cost of transporting C. L. freight and L. C. L. freight, it is assumed that twenty-five solid car-loads can be hauled over a road in one train, each car containing  $14\frac{1}{2}$  tons, and each car weighing 11 tons, and that the cost per train-mile is \$1, and compare the cost per net ton hauled with the cost of hauling in a train of the same number of gross tons, at the same cost per train-mile, but the cars containing only 5.5 tons each of paying freight, and each car weighing as before, 11 tons.

In the first case, of car-load freight, the gross tons hauled are  $14.5 + 11 = 25.5 \times 25 = 637.5$ .

The cost of hauling one gross ton per mile at \$1 per train-mile would be  $\frac{\$1}{637.5} = 0.157$  cent.

The net weight carried in the train is  $14.5 \times 25 = 362.5$ , and the proportion of net weight to the gross weight is as 362.5 to 637.5, or as 1 is to 1.76, or for every ton of net weight there has to be carried 1.76 tons gross weight, and, therefore, the cost of the net weight per ton mile is  $1.76 \times 0.157 = 0.276$  cent.

The number of cars which may be carried on a train of the same capacity, as in the case of full carloads, that is 637.5

tons, assuming each car to be loaded with  $5\frac{1}{2}$  tons of freight, the cars weighing 11 tons, would be  $\frac{637.5}{16.5} = 38$  cars, and the number of net tons carried in this train would be  $38 \times 5.5 = 209$  tons, and the relative proportion of net weight to gross weight would be as 209 to 637.5, or as 1 to 3.05. For every ton of net weight there has to be carried on account of L. C. L. freight, 3 tons of gross weight; hence

The relative cost of carrying car-load freight, if 14.5 tons are loaded in each car, and carrying L. C. L. freight, if 5.5 tons are loaded in a car, on a road over which 637.5 gross tons can be hauled by one locomotive, would be as 0.276 is to 0.479, or as 1 is to 1.74, or the cost of L. C. L. freight in this case would be 74 per cent. greater than the cost of C. L. freight.

The relative weight of car-loads and less than car-loads, upon which the above computation is based, is the average weight of loads in cars, as ascertained from 1,672 car-loads and 4,112 less than car-loads forwarded from New York to the Western termini of the trunk lines, over six trunk lines, in the last half of the months of June to August, a separate month being taken for each trunk line, so as to present, as nearly as possible, the average conditions of the business during half a year.

The highest average loading per car of C. L. freight was on the Pennsylvania in September, say 15 tons per car; and the highest average loading of L. C. L. freight was on the Baltimore & Ohio in August, 1857, 7 tons per car; and in this case, using the same method of computation, the cost per ton mile of C. L. freight would be 0.274 cent per ton-mile, and the cost of L. C. L. freight 0.40 cent, showing that the L. C. L. freight would be 47 per cent. higher than the C. L. freight. The cars on the Baltimore & Ohio are, however, not loaded according to destination, but are all transferred at Baltimore and loaded there for destination, except car-load freight destined to one place and consigned to one party.

Taking the lowest average car-load as ascertained, viz., 14 tons, and the lowest weight of miscellaneous freight per car, viz., 4.3 tons per car, the cost of the L. C. L. freight is twice as great as the C. L. freight.

The relative cost of C. L. and L. C. L. freight is computed upon the assumption that in each case the freight passes over the whole length of the road, or over the whole length of a division. When freight is distributed in small quantities between the local stations of a road the cost of transportation is greatly increased, both as compared with the cost of miscellaneous freight transported over the whole length of a division and as compared with local car-load freight.

The conditions affecting the cost under which local business is distributed between the stations of a road, are very different from those under which the through business is done, and are such as to greatly increase the cost of transportation. In the first place, local freight has to be distributed by special train. The local business is often limited, and trains cannot be loaded to the full capacity of the locomotive. Neither can the cars be loaded as fully as with freight destined to one place. The cars have to be loaded with a view to unloading at the different stations as the train progresses, and as the cars are unloaded they have to go on with lighter and lighter loads, and this increases the relative

amount of gross weight which has to be carried on account of the net paying weight.

As the distribution of freight between the local stations on a road varies so greatly, the only practicable way of obtaining data on which the cost of this service may be ascertained and comparisons instituted, with the cost of moving through freight, is to ascertain by actual observation the amount of gross weight that is carried on account of the net weight on local trains. In the years 1873-4 Mr. Fink made a very thorough investigation into the cost of local freight and the cost of distributing freight between local stations. During the month of November, 1873, and May, 1874, accurate accounts were taken of the gross and net ton mileage hauled by the local trains over the Northern Division of the Louisville & Nashville, between Bowling Green and Louisville, and it was found that during those two months there were hauled for each ton of net freight 4.7 tons of gross; while in through freight the proportion was not more than as 1 to 1.5. The cost per gross ton in hauling local freight is much greater than on through trains, because of the lighter loads hauled on local trains, the cost per train-mile being almost as much, if not more in many cases, than the cost of through trains.

For the purpose of determining the amount of gross and net weight carried on account of miscellaneous and car-load freight, the officers of the Erie and the Pennsylvania railroads made observations on several divisions of their roads, as to the work done by local trains, the results of which were submitted to the Commission, and may be briefly stated as follows.

On a local train of the Pennsylvania, between Philadelphia and Columbia, for 3 days, Jan. 16, 17 and 18, 1888, 5 tons of gross weight were carried on account of one net ton of miscellaneous freight; and  $2\frac{1}{2}$  tons of gross weight were carried on account of 1 net ton of C. L. freight, showing that the cost of miscellaneous freight on this train was twice as great as C. L. freight. Assuming \$1 per train-mile as the cost of running the train, the cost per ton-mile was six cents for miscellaneous freight, and three cents for C. L. freight.

On the corresponding return train, from Columbia to Philadelphia, the gross weight carried per net ton of miscellaneous freight was six tons, and on C. L. freight, 1.7 tons, making the cost per ton mile 2.55 cents for miscellaneous freight, and 0.73 cents for C. L. freight, again showing that the cost of miscellaneous freight distributed between the stations on that division was  $3\frac{1}{2}$  times as much as the cost of C. L. freight. The average of the three east-bound and west-bound trains shows that for each net ton of miscellaneous freight there were carried 5 tons of gross weight, and for each net ton of C. L. freight there were carried 1.7 tons of gross weight, again making the difference in cost between C. L. and L. C. L. freight as 1 to 3.

On a local freight train of the Pennsylvania from Sunbury to Williamsport, Pa., Jan. 16, 17 and 18, on which no C. L. freight was carried, for every ton of L. C. L. freight 4.2 tons of gross weight had to be hauled, or taking \$1 per mile per train run, the cost of the local freight during that time was at the rate of 4.75 cents per ton-mile. The cost per ton-mile on a train loaded to its full capacity, with  $7\frac{1}{2}$  tons of freight in each car, drawn by the same engine, and the freight carried over the whole division would be 0.35 per ton-mile; showing that the cost of distributing miscellaneous freight between these stations is twelve times as great per ton-mile as hauling car-loads of  $7\frac{1}{2}$  tons per car over the whole length of a division.

On a local train of the Erie Railroad, between Susquehanna and Hornellsville, N. Y., Jan. 16, 17 and 18, 1888, on the west-bound train, for every ton of net or paying freight, 8 gross tons had to be carried; and on the east-bound train, for every net ton,  $5\frac{1}{2}$  gross tons had to be carried, or an average east-bound and west-bound of 6.6 gross tons for every ton of net paying freight.

While the experiments made with local trains on the Pennsylvania and the Erie railroads were not continued sufficiently long to establish a general rule, they confirm experiments made by Mr. Fink some twelve years ago on the Louisville & Nashville, and it is safe to assume that for every ton of miscellaneous freight distributed between stations on a division of a road, there has to be hauled from 4 to 8 tons of gross weight (varying with the character of the local traffic), while for every ton of car-load freight distributed between local stations there has to be hauled only from two to three tons of gross weight, showing that the cost of hauling miscellaneous local freight is twice to nearly three times as much as the cost per ton-mile of local car-load freight, while the relative cost of hauling miscellaneous freight over the whole length of a division or a road, as compared with C. L. freight, is 50 to 100 per cent. greater.

From these experiments and computations, Mr. Fink concluded that the popular view that the charges for local traffic are generally too high, is a fallacy; and that, on the contrary, the short haul traffic is generally performed at an actual loss. He submitted, in his testimony, an analysis of the tariffs of the Pennsylvania and Lake Shore roads for short haul traffic, and showed that in some cases the rates charged did not even pay for the mere cost of loading and unloading the freight, leaving no compensation for transporting it, and on all short-haul traffic, say for less than 100 miles, the compensation fell far short of the actual cost.

Mr. Fink referred to and explained the classification adopted by the German State Railroads, which is based upon the distinction between car-load and less than car-load shipments. There is no classification of the different kinds of goods according to their value, as in this country, except in the case of car-load shipments. All goods shipped in less than car-loads are put in one class, and pay the same rate. It costs as much to ship 100 lbs. of sugar as 100 lbs. of silk,

in less than car-load quantities. The charge is 4.5 cents per ton-mile, or for 1,000 miles, equal to the distance between New York and Chicago, \$2.25 per 100 lbs. But if sugar is shipped by the car-load under the German classification, the charge is only 2.1 cents per ton-mile, or at the rate of \$1 per 100 lbs. from New York to Chicago, or less than half as much as when shipped in L. C. L. quantities. These relative charges on C. L. and L. C. L. shipments according to the German classification correspond with the relative cost of transporting these two classes of freight in this country, as computed by Mr. Fink; and he concludes that the present differences in car-load and less than car-load rates, of which complaint is made, are much less than would be justified by the relative cost of transportation.

It is interesting to note the great difference in the charges made by the German and American railroads. For example, on sugar carried over a distance of 1,000 miles, the charge in Germany is \$2.25 per 100 lbs. in L. C. L. quantities, and in this country 38 cents per 100 lbs.; and if carried in C. L. quantities, the charge in Germany is \$1 per 100 lbs., and 26½ cents in this country.

#### The Erie System of Continuous Heating.

The principal peculiarity of this system lies in the manner in which a metallic connection between the cars is rendered flexible by means of a coil of brass tubing and a sliding joint or piston. The construction of these parts will be clearly understood by a reference to the engravings, and it will be seen that the piston packing can be tightened from the outside by the lock nuts on the pipe forming the piston rod.

It is obvious that the coiled tube avoids the leakage which generally accompanies a ball joint, and that the provision for readily tightening the piston packing removes many of the objections against sliding joints.

It is claimed that when the cars part, the inner tube will pull out without disturbing the packing and that when the cars are again coupled, this tube can be inserted and will work tight as before.

The construction of the coupling will be readily understood from the drawing. The packing seats rest against spiral steel springs which hold them firmly together. When the seats become worn it is claimed that the shell can be screwed out and another inserted without removing the coupling. All the couplings are exactly alike.

The exposed pipes are covered with non-conducting composition, and the coil of tubing is shielded with a case of indurated fibre so as to lessen the condensation.

The piping inside the car is so arranged as to give a continuous circulation, and the pipes have a slight fall from either end towards the centre of the car so as to permit the water of condensation to drain into a suitable trap.

On roads exposed to exceptionally severe climate, it is proposed to supplement this system with a boiler in the baggage car which need be used only when the locomotive is detached.

The advantages claimed for this system are: *Simplicity*, especially in the connections; *efficiency*, as leaks are minimized; and *economy*, as all the parts are of durable material and not liable to wear.

This system of car heating has been in use for some time on the Enon Valley, a branch of the Pennsylvania Company, near Pittsburgh. A trial train will also be shortly running on the Lake Shore & Michigan Southern.

#### TECHNICAL.

##### Locomotive Building.

Fifteen switch engines and 120 freight cars are being built at the Chicago shops of the Chicago, Milwaukee & St. Paul.

The Louisville, New Albany & Chicago has received the last of 12 consolidated engines ordered some weeks ago, and the company now has 87 engines, 72 of which are first-class locomotives.

The Pittsburgh, Fort Wayne & Chicago has built 35 locomotives at its Fort Wayne shops during the past year.

The Maine Central is building two locomotives at their shops in Waterville.

The Ohio & Northwestern has lately received two new locomotives.

##### Locomotive Notes.

It is stated that in future no new locomotives will be built at the local shops of the Union Pacific, and that all new work will be done as far as possible at Omaha.

##### Car Notes.

The Eastman Freight Car Heater is to be applied on 200 cars on the New York, Lake Erie & Western. These cars will be equipped with the Lorraine vertical plane coupler.

The Southern Car Works, of Knoxville, Tenn., has the contract for building a large number of box and flat cars for the Chattanooga, Rome & Carrollton, to be built at once. It is reported that the works will be moved to Atlanta, Ga.

The New York, New Haven & Hartford has contracted with the Wason Manufacturing Co., of Springfield, Mass., for 10 new drawing-room cars, to be completed by June 15, at a cost of \$11,000 each. In addition to these, the road is having 30 passenger coaches built by the Barney & Smith Mfg. Co., at Dayton, O., all to be completed by June 1, at a cost of \$5,500 each. The cars are to be finished in mahogany, upholstered in old gold plush and furnished with curtains. The transoms over the windows, which have proved to be such dust admitters on other cars, are to be dispensed with. Eight of these coaches are to be fitted up as smoking cars, with interior finish of old oak and red plush upholstery.

The Billmeyer & Small Co., York, Pa., and the St. Charles Car Co., St. Charles, Mo., have each contracted with the Mexican National for 12 passenger and 4 combination cars. The Central of New Jersey has ordered 500 new freight cars.

The Toledo & Ohio Central is asking bids for 10 passenger cars and 3 mogul locomotives. The Chicago, Burlington & Northern has just ordered another large lot of box freight cars.

#### Car Heating Notes.

The Graydon Safety Car Heating Company has been incorporated. The capital is \$1,000,000, divided into 20,000 shares of \$50 each. The directors are William M. Graydon, Andrew Graydon, Charles Autin, Edward Hawkins and L. H. Blanton. The principal office will be in Indianapolis. A trainman on the Grand Trunk in charge of the Martin heater writes: "The weather this morning was 25° below zero at Cornwell. From there all the way to Montreal the passengers rode without wraps, and the long coach which was furthest from the engine was very comfortable. A temperature of 75° was kept up through the entire train."

#### Car Lighting.

The Railroad Commissioners of Massachusetts and Vermont have recently inspected the Barrett system of car lighting on the Connecticut River road.

#### Bridge Notes.

The city of Milwaukee will build a bridge over the North Menomonee Canal at a cost of \$40,000.

Bids for building a bridge across the Saluda River will be received until Feb. 11 by J. P. Goodwin, Greenville, S. C.

It is proposed to bridge the Monongahela River at Dravosburg, Pa.

An iron bridge is proposed at Point of Rocks, Md. Address J. D. Baker, Frederick, Md.

The Carrollton & Prestonville Bridge Co. is being formed to build a bridge across the Kentucky River at a cost of about \$60,000. Address J. E. Geier, Carrollton, Ky.

The Chicago Safety Bridge Co., of Chicago, has been incorporated with a capital of \$100,000. The incorporators are J. S. Phelps, W. G. Nicholson and Payson McKillip.

The county commissioners of Elberton County, Ga., have erected two bridges across Beaver Dam Creek.

Proposals are wanted at Elk City, Kan., for the erection of an iron bridge. No date specified. Address H. Woodring.

The San Francisco Bridge Co., which made an assignment on Jan. 17, with liabilities of \$400,000, has resumed business on an extension of time granted by the creditors, and will pay all claims in full.

Proposals are wanted at Kansas City, Mo., for the construction of nine bridges; no date specified. Address County Clerk Burr.

Proposals are wanted at Washington, La., until Feb. 10, for the construction of an iron draw-bridge. Address Leon Wolff, Washington, La.

Bids are wanted for a railroad draw-bridge at Sen Isle City, N. J., to be completed May 1. Address 1017 Chestnut st., Philadelphia, Pa.

Bids for building a pile dike at Canarsie Bay, New York, will be received by Col. G. L. Gillespie, Army Building, New York, until Feb. 15.

Senator Wilson's bill providing for a railroad, foot and wagon bridge to be built across the Mississippi River at Burlington, Iowa, was passed by the Senate Jan. 24.

A bill has been introduced in the New York Assembly incorporating the New York & New Jersey Bridge Company, with a capital of \$10,000,000, and with power to lease the bridge to any railway.

The bridge shall be 135 ft. clear above high water at spring tide. George S. Field, William Libby and George Hoadly are appointed commissioners to locate the bridge. Plans must be approved by an engineer commissioner appointed by the Governor at \$10,000 per year.

The bridge will cross the Hudson, with one central pier, from Washington Heights to Fort Lee.

#### Manufacturing and Business.

Proposals will be received till Feb. 20 for labor and material for taking down and rebuilding Skilgate Light-house. Address Colonel S. M. Mansfield, Detroit, Mich.

Giles Brothers & Co., of Chicago, recently received from a single watch-case manufacturer an order for 50,000 anti-magnetic shields.

The Universal Radial Drill Co., Cincinnati, Ohio, is shipping its radial drills at the rate of two a week.

The M. Ebert & Co., of Philadelphia, have furnished 120,000 ft. of roofing material to the new shops of the Burton Stock Car Company, at Wichita, Kan. They have also furnished 100,000 ft. of roofing to the new Union Stock Yards of Wichita.

The Mason Regulator Co., of Boston, have lately received orders for their reducing valves for steam car heating from the Pennsylvania, Boston & Albany, Connecticut River, Lehigh Valley and New York, Susquehanna & Western; also from the Martin, Sewall and Graydon car heating companies.

Gould & Eberhardt, of Newark, N. J., have lately received an order for two 60-in. bolt cutters from Morgan, Williams & Co., Alliance, Ohio; also for a cutter of the same size from the Betts Machine Co., Wilmington, Del.

The shops of the Sheffield Velocipede Car Co., Three Rivers, Mich., were partially destroyed by fire lately. Loss about \$30,000.

#### Iron and Steel.

The National Tube Works, of McKeesport, Pa., and the Continental and Pennsylvania Tube Works have ordered a reduction of 10 per cent. in the wages of their employees. It is said that the works will be closed if the reduction is not acceded to.

Numerous other iron working establishments have ordered reductions.

The blast furnaces of the Troy Steel & Iron Co. were banked last week, the employees having refused to accept the 10 per cent. reduction of wages. About 3,000 employees are out of work.

The North Chicago Rolling Mill will resume operations Feb. 6. The wages question has been settled with all employees except the laborers.

At the annual meeting of the Benwood Iron Works, last week, the following directors were elected: John G. Hoffman, L. S. Delaplain, A. W. Cambell, G. B. Caldwell, E. W. Paxton, L. F. Stifel and Jacob Wise.

The Oliver Iron & Steel Co., of which H. W. Oliver, Jr., is President, has been organized to operate the Monongahela Iron Works, at Pittsburgh, Pa.

The Bethlehem Iron Works, of Bethlehem, Pa., have received from England a car load of machinery for the new steel forging works, and the work of placing has already begun.

The Vulcan Iron Works, of Chicago, have been awarded the contract for the machinery for operating a draw-bridge over the Willamette River at Portland, for the Oregon Railway & Navigation Co.

The Warren Tube Co., Warren, O., has shut down the works and discharged all its men. The cause is said to be that several suits, aggregating \$45,000, have been commenced against the company.

The furnace of the Elliott Iron Works, at Round Mountain, Ala., which is now being relined, will be completed in March, and will then blow in again on cold-blast charcoal for car wheel iron.

The Newport Iron & Steel Co. has been organized at Newport, Ky., for the purpose of operating Swift's iron and steel works, lately purchased by Henry A. Schriver. Mr. Schriver was elected president, and the mill is in full blast.

The Birmingham Rolling-Mills, Birmingham, Ala., is on









Published Every Friday.  
At 73 Broadway, New York.

#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

On another page will be found an abstract of the testimony of Mr. Fink before the Inter-state Commerce Commissioners in the car-load lots case last week. It is a study from actual experience, of the relative cost of carrying freight in car-loads and less than car-loads. As a contribution to the literature of transportation it will have permanent value, apart from its bearing on the question now before the Commission.

Several large lots of railroad bonds have lately been taken by various syndicates and are now offered on the market. In this way, the Northern Pacific has placed \$8,000,000 of its authorized \$12,000,000 third mortgage loan and the Chicago, Burlington & Quincy has placed \$7,500,000. Miscellaneous new issues of various corporations have been taken by syndicates in smaller quantities, amounting in the aggregate, however, to a very large sum. The Manitoba offers \$2,000,000 first mortgage bonds of the Montana Central, and it is further said that it has sold to a syndicate \$3,500,000 five per cent. bonds of the Eastern Railway of Minnesota. These latter will not be delivered till next April. It is gratifying to note that these new issues as well as the bonds of older issue which the great syndicates have been carrying have within the last week or two been bought by the public very freely. It is now said that three-fourths of the Northern Pacific new third mortgage and \$5,000,000 of the Chicago, Burlington & Quincy have been sold. The result of the active sales to the public is already felt in the relief of the syndicates, and one indirect result will very possibly be seen in the stimulus to new enterprises. The new bonds which have lately been disposed of do not provide, however, for new construction. They provide for indebtedness already incurred or for completion of work now under way. In fact, the Chicago, Burlington & Quincy, Atchison, Topeka & Santa Fe, and Chicago, Rock Island & Pacific have contracted to issue no more bonds in 1888. The Eastern of Minnesota loan announced by the Manitoba as to be marketed next spring is doubtless intended to provide for the building of the line from Hinckley to Superior, which will give that road its much-needed outlet to the lake.

The Pennsylvania has lately placed an order for 30,000 tons of rails at \$31.50 per ton. The order is divided between the Pennsylvania Steel Co., the Cambria Iron Co., and the Edgar Thomson Steel Works. It is said also that the Chicago, Burlington & Quincy has placed an order for 20,000 tons with the North Chicago Rolling Mill Co. The rail-makers look upon these orders as the signal for action among the roads generally. It is expected that other companies will now quickly follow with orders for a like percentage of their probable needs for renewals. Notwithstanding the diminished call for rails for new construction, the rail-makers have reason to look for a prosperous year. The normal consumption for renewals will take about 750,000 tons a year, and supposing no more than 6,000 miles to be built this year, that would require

say 600,000 tons more. The production of 1887 is estimated at about 2,000,000 tons, but a considerable part of the capacity of the mills which was diverted to rail-making last year is likely to be turned now to other products.

The United States was not the only country which built railroads actively in the year 1887. The statistics of the German Railroad Union, which have been published with commendable promptness, show the same remarkable expansion. In the territory covered by this association, which includes Germany, Austria, and parts of the adjacent countries, 1,600 miles of new line were built in 1887, against barely 900 in 1886, and less than 800 in 1885. These figures seem small compared with those of the United States; but it must be remembered that the area covered is also much smaller. Their true significance is seen when we compare the proportionate growth in different years. We find that the increase in the United States was 12,700 miles in 1887, 9,000 in 1886, and 3,100 in 1885. Both in America and in Central Europe, the increase of mileage in the year 1887 was approximately equal to that of two previous years put together. The striking thing in both cases was the absence of any revival of general business at all corresponding to the increased activity of railroad building. It is easy to understand why there was active construction in 1880-82, in 1871-72, or in 1856, because there was active speculation with high prices for everything, transportation services included. But why the same thing should have happened while prices were so low as they have been recently, is much harder to explain. Nor does this new set of facts from Germany help us about the explanation—except so far as to warn us against accepting any superficial one. Half of this German union increase is in Austria; and Austrian railroad affairs are in anything but a prosperous condition. Increased tariffs on grain have threatened to deprive them of much of their long-distance traffic. Grain exports in 1886 were but little more than half what they had been in 1885; it is believed that in 1887 they were less than in 1886. On business other than grain the volume of traffic has increased, so that the aggregate gross earnings seem to have been well kept up. But the earnings per mile present by no means so satisfactory a showing; and at the very time when so many new lines were built, the price of Austrian railroad securities has been falling decidedly. An explanation of some of these things is almost impossible; but the parallel between the facts in the United States and Austria is a striking one, even if it be impossible to explain them.

It has been suggested that the disastrous effects of the Haverhill accident might have been mitigated by the use of six-wheeled instead of four-wheeled trucks. While it is undoubtedly true that a six-wheeled truck running on five wheels is safer than a four-wheeled truck running on three wheels, it is well to bear in mind that prevention is better than cure, and that it is sound sense to endeavor to prevent accidents altogether rather than to devise means to lessen the evil effects of accidents when they do occur. It is perfectly possible to use absolutely safe wheels and axles under passenger coaches, and though the first cost is considerably higher than that of weak and untrustworthy wheels and axles, the extra cost of the best wheels would not exceed that of an extra pair of inferior wheels, with the additional axle, axle-boxes, springs, equalizers, pedestals and longer frames, etc., necessary for a six-wheeled truck. A four-wheel truck with safe wheels and axles would not only be no more expensive than a six-wheeled truck with poor wheels, but would be lighter, simpler and make less noise in running. The four-wheeled truck has also important advantages over the six-wheeled truck in the greater ease with which brakes can be applied to all the wheels, which has never hitherto been accomplished in actual practice with six-wheeled trucks. The resistance on sharp curves is less with four-wheeled trucks, partly because the wheel-base is shorter and partly owing to the absence of a centre pair of wheels, which must give additional friction on a sharp curve. Last, not least, a four-wheeled truck with good wheels is considerably safer than a six-wheeled truck with poor wheels. Its only disadvantage lies in the fact that a six-wheeled truck gives a smoother motion to the car than a four-wheeled truck; but when the latter has a long wheel base and properly proportioned spring gear no difference in the riding is perceptible on a good track, though on a rough road the six-wheel truck manifests its superiority in this respect.

The influence of grades and curves on the wear of rails is largely modified by the quality of the rails,

the length of the grades, their position in relation to stations, and the weight, flexibility and condition of the locomotives and rolling stock. It is therefore difficult to obtain any trustworthy figures showing the relation between grades and curvature and the wear of rails. The climate has also an important influence, as, should mists and light rains be frequent, the free use of sand is rendered necessary, materially increasing the wear of the rails. The nature of the soil and ballast also induces engines to slip on some grades, while on other grades, though steeper, slipping seldom occurs. Such a phenomenon is not uncommon in the experience of many engineers. The somewhat contradictory results shown in the tables of the relative wear of rails on different curves and grades on German railroads (given in another column) show the extent to which conditions other than those of grade and curvature affect the wear of rails. The results for grades of less than 1 per cent. are probably based on a large mileage, and as accidental factors are thereby eliminated, the results show a regular and progressive increase of wear with each degree of curvature. A rough average of the results shows that on grades of less than 1 per cent. (52.8 ft. per mile), the wear on curves of less than 2 degrees being taken as 100, the wear of curves between 2 and 3 degrees is 150, or 50 per cent. greater, and that on curves between 3 and 4½ degrees, the wear is 200, or 100 per cent. greater than on the easier curves. The result may therefore be taken as confirming the supposition that the wear increases as the degree of curvature. While the figures given in the table are apparently trustworthy for curves of moderate radius, the results on sharper curves, especially on steeper grades, are contradictory, and are probably based on insufficient data, or are taken under widely differing conditions as regards weight of engines, quality of rails, the use of sand, etc.

It might, however, be expected that the effect of curves on the wear of rails would be most clearly shown on the moderate grades, where the average speed would be higher and the wear due to grade would be small in proportion to that due to curvature, thus allowing the effect of curves to be more clearly visible. It, however, appears that the wear of rails per ton hauled is considerably influenced by the steepness of grade, and on grades of from 2 to 2½ per cent. (105.6 ft. to 132 ft. per mile) the wear is fully double that on grades below 1 per cent., the curves in each case being similar. The relative wear on up and down grades appears to be as 1 to 2, showing that the wear due to brakes and the higher speed are very considerable factors. This proportion appears to hold good both on very heavy and on light grades.

These results are at the best but rough approximations, but they are the result of a considerable number of observations taken with painstaking accuracy and care, which is a distinguishing characteristic of German investigators.

The drawings of the spring buffer used on the locomotives of the Delaware, Lackawanna & Western, given on another page, are of considerable interest at the present moment, when it is an open question whether it would not be advisable to adopt spring buffers on freight cars in connection with vertical plane couplers. Spring buffers have been so little used in this country, except in connection with passenger cars, that their action and construction are little understood. The spring buffer used on the Delaware, Lackawanna & Western is very cheap and simple, though its form of construction would be regarded in Europe, where buffers are nearly universal, as somewhat old fashioned. Wrought iron buffers, like wrought-iron draw-bars, are less liable to break under heavy blows, and are easier to handle in the repair shop than the heavier cast-iron article, but a wrought-iron buffer is difficult to make in an ordinary shop, though with special tools and appliances it can be manufactured in large quantities at a reasonable price. A really good buffer should be fitted with a rebound spring, to cushion the blow on the fastenings of the buffer plunger when the compressed spring is relieved of strain.

The spiral form of spring possesses many advantages, as it is cheap and easily made and tempered, but properly proportioned rubber and volute springs are very suitable for buffing springs. The resistance of the rubber increases rapidly with the travel, the rebound is not so rapid as with a steel spring, and rubber, if of reasonable good quality, cannot fail suddenly, as is sometimes the case with even the best steel spring. The volute spring is very light for its strength, and as it works with considerable friction between the leaves, the resistance during compression is



increased, and the force of rebound is diminished by the amount of this friction. This is a strong point in favor of volute springs for buffing where the resistance to compression should rapidly increase and the force of the rebound be exerted gradually and with little more force than is necessary to return the plunger to its proper position. If a spiral buffing spring is used it should be provided with an internal spindle, so that the spring cannot buckle under compression.

It is obvious that if spring buffers are used in connection with vertical plane couplers, some pains must be taken to prevent the recoil of the buffers throwing the cars apart before the coupling is effected. A spring acts with great rapidity and unless the locking gear of the coupler is still faster than the buffer spring, some uncertainty will exist in coupling cars. The face of the buffers must have a tolerably exact relation to the coupling faces of the Janney type coupler. If the buffers project too far, the coupling cannot be effected unless the cars are run together with some force, compressing the buffer springs sufficiently to allow the knuckles to engage. On the other hand, if the buffer face is not sufficiently prominent, the drawhead will have to bear the brunt of any heavy blows in switching, etc.

There can, however, be little doubt that spring buffers will save a great deal of the injury to freight now caused by the sharp blow inflicted when comparatively unyielding dead blocks are brought forcibly together. The latter save the drawhead and draft timbers, but are the cause of considerable injury to stock and freight. Spring buffers will undoubtedly cost more and require more care and repairs than dead blocks, but they may be expected to protect the drawgear at least equally well and materially lessen the damage to stock and freight and the end posts of cars.

The length of the future standard drawhead should evidently be mainly fixed with a view to secure a strong, safe and efficient draw gear. The dimensions should also involve a minimum of change in existing methods, but this is a secondary, though important, consideration. The question of increasing the distance between the cars should not be allowed to interfere with the adoption of otherwise suitable dimensions. Projecting running boards are easily applied and should be more generally used, while if spring buffers are to be substituted for dead blocks, some room will be required for an efficient buffer, which cannot be made less than 8 in. or 9 in. long. It is, perhaps, too much to hope that the general adoption of continuous brakes on freight trains will render it unnecessary for the brakemen ever to run along the tops of the cars, but this practice will doubtless be considerably diminished within the next few years.

A Lynchburg (Va.) correspondent asks for a decision on the problem presented in the following case:

Under the new uniform code an order is issued reading:

"Engine 989 will run as a special passenger train, leaving Hong Kong on Thursday, Jan. 19th, on the following schedule, and will have the right of track over all trains:

Leave Hong Kong.....	10:10
Bangkok.....	10:26
Shanghai.....	10:57
Arrive Siam.....	11:10

Our correspondent asks how this special shall treat first-class trains running in an opposite direction; will it run on prompt time, or will it wait five minutes variation of watches? No. 2, an opposing train, is due at Shanghai at 10:57. If No. 2 has not arrived there at 10:57, is the special to leave on time, or must it wait the five minutes variation?

The special is not required to wait. The uniform code says nothing about variation of watches nor about one train waiting for another. The principle adopted is that the train of inferior right shall take all the precautions necessary and that the train of superior right shall take none, except that it must approach the station under control. According to the rule under form G, which is the form embodied in the above order, No. 2 must clear the special as many minutes as it would clear a first-class train. Assuming that No. 2 is a first-class train it would, in meeting another first-class train, simply clear it; that is, have the main track switch "closed," say, in this case, one second before 10:57. If it cannot reach Shanghai and clear the track by 10:57 it must stop at some point before reaching there. If, under the time table, No. 2 is first-class and has the right of road over opposing trains of its own class it, of course, is never required by rule to clear anything; but the committee doubtless intended that first-class trains should treat a special of this kind in the same manner that they would an opposing train of their own class to which they were subordinate at meeting

points. All this on the assumption that rule 85 is used as printed. It is to be noted though, that the committee recommend the modification of this rule where "greater protection is necessary." There is an inconsistency in the example and rule under form G, for, while the example fairly implies that the special is of a class superior to first class, the rule assumes that it is on a par with first-class trains. A first-class train running ahead of, and in the same direction with the special might, in connection with rule 106, have a doubt as to its rights, and waste some time, to say the least. The committee seems to regard five minutes as the minimum time that can be safely allowed for any train to clear another which is following it.

The language of rule 85 is weak in that it leaves each conductor or engineer to decide for himself how long before the time of the other train he must clear the track. Certainly no one would deem it safe to clear less than two seconds; others would say ten minutes. Who shall draw the line? The rule should say explicitly. If one minute, say so; if ten seconds, say that. Under rule 85, engineers are left to use their own judgment as to what is the "full running" time allowable in which to reach a given station; this violates the time-honored principle that the superintendent and not the engineer shall limit the speed of trains. The Pennsylvania has used these rules several years; but it is said that there is an "understanding" among the runners that the ruling train will run so as to pass (leave) the critical point a minute or two late, unless the other train is met or there is a view for a good distance. But this practice is an evidence of weakness in the rules rather than a justification of their wisdom.

## THE PACIFIC RAILROADS AND THE GOVERNMENT.

### II.

The present state of the Union Pacific affairs is this. The company owes the Government in round numbers, \$50,000,000; \$27,000,000 U. P. subsidy, \$6,000,000 K. P. subsidy, \$17,000,000 net arrears of interest, etc.

The United States Government is forced to advance annually about \$2,000,000 of interest on subsidy bonds in various forms. To meet these advances, directly or indirectly, the Government, under the terms of the Thurman act has, first, its own transportation charges remitted; second, five per cent. of the net earnings of the companies; third, \$850,000 in good years, in bad ones a percentage of the net earnings of the company, which amounts to considerably less than that sum. Under the most favorable circumstances this would cover the interest advances of the Government, and contribute a small amount to the reduction of the principal of the debt. But circumstances have not been favorable, and are not likely to be. In the first place, every reduction in transportation rates makes the Government apparently worse off. In other words, it saves less by having its transportation for nothing when railroad rates are low than when they are high. Owing to this and other causes the nominal value of the Government passenger and freight business on the Union Pacific Railway itself seems to have decreased steadily from \$700,000 in 1880 to \$250,000 in 1886; while the figures for the whole system also show a diminution, though a less striking one. Meantime the net earnings of the company have been so far diminishing that the other source of payment is also rendered less fruitful. The Government is losing money at both ends—an apparent loss at one end, a real one at the other.

While the existing law is thus inadequate to protect the Government, it seriously hampers the company. It virtually takes out of the company's treasury sums amounting up toward \$2,000,000 annually. Part of this is invested in a sinking fund at about 2½ per cent. interest; the rest goes indirectly to increase the surplus in the U. S. Treasury. In neither case does it do very much good; and meantime it hampers the company in making improvements and extensions which are almost necessary in the keen rivalry which has arisen for the business of the far West. This check upon the action of the company not merely lessens its net earning power, but actually tends to diminish the security which the Government can have for the ultimate collection of its debt.

Thus the present arrangement is unsatisfactory to all parties. It remains to consider the various changes which have been proposed.

1. *To sue the old management.* This is good from every point of view but one. That one point is the prospective difficulty of winning the suit. "First catch your hare." Any proposal to settle the debt of the Pacific Railroad out of the pockets of the old management should not ignore this initial difficulty. This is our only ground of objection to the plan. We believe

that speculators who have abused their positions of trust in the management of the Pacific railroads are directly responsible for many of the present difficulties; and that any money which these speculators could be forced to contribute to the settlement would be a gain to the companies, to the United States Government and to public morals. But we are not sanguine of success in this direction. It may be the only thing to do in the case of the Central Pacific, where the management pocketed a large part of the profits as long as there were any and then transferred their interests to a rival line in such a way that, if the Government tries to oust them in 1897, they themselves would lose comparatively little. But such a measure, even in that case, will only be a last resort, to be adopted because it furnishes the only chance of self-protection rather than because it is a promising one in itself.

2. *To increase the percentage requirements under the present system.* This plan is subject to almost as great legal difficulties as the first and also involves a great many practical drawbacks which would probably make it defeat its own ends. It is exceedingly doubtful whether the courts would allow Congress, by merely one-sided legislation, to require the Union Pacific to pay 45 per cent. of its earnings into the treasury instead of 25, and thus find itself face to face with a deficit. Things have changed since the time when the Thurman act was passed by Congress and sustained by the courts. Then the Union Pacific was paying dividends to its stockholders, and apparently making no provision to repay the sums which the Government had advanced and was advancing. To-day both these conditions have changed. The company is making payments to the Government as arranged; it is not paying dividends; and the same set of events which has made the Government's position unsatisfactory has made the position of the company still more so. In 1878, the courts were disposed to stretch doubtful points of law in favor of the Government; to-day they would not be.

But even if they were so disposed, a violent policy in this direction would react against the Government itself. Union Pacific stock is now largely in the hands of investors. It is important that it should remain so. Mr. Adams is right in saying that this state of things affords the best security which the Government can have. As long as the management really represents investors it is forced to take care of the permanent interests of the property. But if Congress, by any action looking solely to the immediate pecuniary advantage of the government, should render Union Pacific stock useless as a legitimate investment, it would be thrown into the hands of speculators—not to say thieves. It is all a question of price. The investors base their price on what they expect to earn. The thieves base their price on what they expect to steal. If Congress reduces the legitimate prospects of the road too low the speculator can buy from the investor to sell to the thief—and he probably will. Let the road fall among thieves and more can be stolen in a year than can be recovered in a lifetime.

The Union Pacific is nearer the danger point than some people suppose. It has large net earnings, but it also has large fixed charges; and the attempt to increase the percentage of net earnings to be paid the Government would soon wipe out the \$3,000,000 annual surplus, unless these fixed charges should be diminished—that is, unless a suit against the old management could be carried through in a way to put the company in a better financial position. This is highly improbable.

3. *To declare the charters forfeited, and reorganize the roads at once.* This was the course advised by Gov. Pattison in his minority report as Pacific Railroad Commissioner. It has the merit of simplicity, but almost no other. It is not likely that it could be carried out, even if it were desirable; and there are a number of reasons which make it highly undesirable. The chance for anything like honest administration under disputed receiverships is small at best; and if political considerations were mixed up with those of business, we should have no chance at all for conservative management. It would simply give an opportunity for more money to be made by individuals at the expense of the road, and would leave correspondingly less which the Government could ever hope to realize. Any one who supposes that it will be a gain to the creditors of the road to take it out of the hands of investors and put it into those of politicians, is grievously mistaken.

4. *To extend the time of payment of the debt.* This has been the plan advocated by most of those who have studied the question carefully. It is recommended in the majority report of the Pacific R. R.



Commissioners. They propose a system of annual payments on the part of the Union Pacific of \$1,776,000 for the first ten years, and \$2,030,000 afterward until the gradual extinction of the debt. A similar arrangement is suggested for the debt of the other companies. Other plans have been proposed at different times without various rates of payment, but with the same general object in view.

To a certain extent these plans are unquestionably good. The system of fixed requirements is better than percentages of earnings, because the latter gives rise to vexatious and expensive disputes. A long term of payment is better than a short one, because very heavy payments for a few years would wreck the company financially and thus really hurt the government interests also. But we do not like the system on which these payments are computed. They are supposed to arrange for the discharge of the debt of the company to the Government. How is this debt computed? The Government is allowed no interest on its advances under the guarantee; but the company is allowed to discount the value of the debt at maturity at compound interest. In other words, no payments between now and 1897 are to be regarded as payments of interest. The effect of this is that while the net balance of obligations in favor of the United States to-day is \$50,172,000, the present value of that balance plus \$20,000,000 of additional payments yet to be made is only \$50,757,000. Technically this computation can perhaps be defended; but the reduction from \$20,000,000 to \$600,000 is rather steep, even for an expert sinking fund accountant.

Do we mean that the annual payment should be increased? No, we mean just the opposite. We mean that the amount of the debt should not be the standard on which the annual standard should be based; that we should stop trying to collect the whole in ways which will probably fail, and should try to collect all we can in ways which will probably succeed. The attempt to collect the whole, leads to tricks of accounting to have it appear as small as possible. It leads so good a man as Senator Hoar to make mistakes in arithmetic. It leads to delusive plans by which the company is to pay a certain sum now, and a larger sum a few years hence; as though we had a right to expect that railroads would become much more profitable in the future than they are now. Above all, it diverts men's minds from the most practical question at issue—the question of having the roads honestly managed. If they are thus managed, the Government will gain in the long run; if they are not, the treasury may gain a few hundred thousand dollars to-day, at the cost of as many millions a few years hence. Such an indirect loss would almost certainly result from a reckless attempt to collect the whole debt offhand, whether by foreclosure or by increase of percentages.

Instead of agreeing with President Cleveland that the collection of the debt should be the direct object of our plans, we believe that honest management of the property should be the object; that in this way we shall collect all we can, while in the other we are more than likely to defeat our own ends. Honest management can probably best be secured by having the stock controlled by investors; it certainly will not be maintained if the road becomes a plaything of speculators or politicians. Our plan would be as follows: Let there be a system of fixed annual payments, based not upon ingeniously computed values of the debt, but upon what the company can pay and still remain a legitimate investment. Let this amount be moderate; but let it run for a very long term, perhaps as a perpetual obligation. Abandon the sinking fund at 2½ per cent., and let the money be used, for the present at any rate, to pay advances of interest under the guarantee. In addition to this let the United States receive a certain percentage of all cash dividends actually declared by the company in future, say 25 per cent., for instance; so that if the company divided \$3,000,000, the United States would receive \$750,000, besides the fixed annual payment. It would involve some trouble to agree upon these amounts; but when they were once settled there would be little opportunity for further dispute. The sums due would be perfectly definite, while the burden would be adjusted to suit the varying conditions of traffic. Moreover, the need for Government interference in the finances of the company would be lessened. If dividends were earned but not declared, the security for the fixed payment would be increased; if they were declared on too liberal a scale the Government would at least receive an additional payment of cash to compensate the risk.

We do not claim that the Government could collect the whole debt in this way, but we believe that there would be more collected and less wasted in this way than in any other.

#### Statistics of Operation.

As the railroad system grows, so grows the necessity for more definite knowledge in regard to the various classes of traffic, the different items of expense, and the relation between the two. The gradual reduction of earnings, per unit of traffic, makes it vital to the railroads to reduce operating expenses, and to that end more and more minute details must be attacked. The Pennsylvania road goes thoroughly into many matters of detail, especially as regards its mechanical and road departments. The Louisville & Nashville was also one of the pioneers in this field, analyzing minutely the conditions and results of traffic operations. The methods established by these two corporations have been of great use to railroad students, and have been more or less followed by others endeavoring to get closer records of the conditions of revenue and expense on their lines. On various other roads considerable advance has been made in what might be called "operating statistics." An outline of the system in force upon one prominent Western road may be of interest to those who are endeavoring to work in the same direction.

The first feature worthy of notice is the system of statistics relating to the revenue of the line, both in the passenger and freight service. The main object desired is to take all tickets and way bills, and from them tabulate such information that the original tickets or way bills will not have to be referred to again. Any question which can be expected to come up about the traffic should be met by the information contained in the tabulated statements, and can be readily compiled therefrom. Various modifications towards this end have been made from time to time, until now it is claimed that only in exceptional cases is there any necessity for an examination back of the tabulated records.

In the passenger statistics there is a separate record of the number of fares, money collected, mileage and earnings per passenger per mile on each class of business. The record also shows the business in detail, as above, received at and forwarded from each station of any importance, and a similar tabulation in relation to connecting lines and foreign roads whose coupons have been honored upon the road in question. Another grouping shows the details for through business in each direction, and local competitive and non-competitive business. It will be seen that nearly any question that can be asked relating to the passenger traffic of the road can be readily and easily answered.

As regards the freight traffic, there is virtually the same class of records, only changed to suit the necessities of the case. Here, instead of the different classes, as in passenger traffic, we find an account with some 60 prominent articles of freight, which, on this particular road, experience has shown to be enough of detail. The number of articles, number of pounds carried, earnings, mileage and earnings per ton per mile are shown for each class. The various tabulations show, as in the passenger statistics, the movement in detail to and from all important and terminal stations and connecting lines, and the movements of through, local, competitive and non-competitive business, so that the earnings in gross or per ton per mile, can be readily obtained for any class or quantity of business moved.

In addition to the above there is much statistical work involved in keeping the records for the various pools in which the road is concerned. The earnings due to each division and branch are also recorded, as a separate account is kept with each. Though all these records involve much clerical labor and detail, yet the extra amount of money expended is not considered excessive. Before this system was originated, the call for any statement regarding the traffic often necessitated the examination of the original way-bill or ticket record. The data obtained for each statement were, as a rule, not available for another, which might cover widely differing ground, and the same routine would have to be gone over, thus involving time and expense. It is estimated that taking into consideration the natural growth of the business on the line, for the last few years, the statistical expense is not what would have been necessary to furnish the individual statements that were formerly called for, while much additional information of value is given which was not before obtainable, except at great expense.

As regards the operating expenses of the road, there is the same detail. Any particulars that were formerly kept of the various operating accounts were originally placed in the auditor's office proper, and had the effect of largely complicating his accounts. These details were often inaccurate, as it was almost impossible to detect any mistakes so long as the total of a pay roll or material distribution was accounted for. It was desired to establish such records, that each officer con-

nected with the operation of the road could have, if desired, a complete record of the expenses, for which he was responsible. In order to reach this end, a system of records was established aside from accounts kept in the auditor's office proper. The distributions sent to the auditor of expense since the inauguration of this plan, merely show the total of each account charged to each operating division or branch of the road, no details being given under the different operating accounts.

At the same time that the distributions for the Auditor are drawn off at the different offices and shops, the material is tabulated for the reports to the statistical office. These tables consist of a supplementary set of distributions showing much more in detail the expenditure of the money which is reported to the auditor of expense in bulk. Every operating account has a number of sub accounts which are kept for each division of the road and for individual branches. A printed book of instructions from the management shows the definition and grouping of the different items. For instance, road repairs has under it sub accounts similar to the following: Renewal of rails, renewal of ties, repairs frogs and switches, renewal of ballast, surfacing, shoveling snow, repairs road crossings, etc. These statements or distributions when received are tabulated separately under the headings of labor, material, vouchers, credits and total.

Having a system of records as above sketched out, a comparison can be made from month to month, or from year to year of the expense of any account, or sub account on any division or branch of the road. In case the amount expended is considered wrong in some respect, the person seeking information can be told whether the discrepancy is in labor, material or vouchers, and a further examination can be made if desired, tracing to the particular voucher, pay roll or material requisition which covered the charge in question.

It may seem at first sight as if much complication was involved in the operating expense records just described, but through the employment of suitable blanks and forms, the clerical expense actually necessary is small. Most of the preliminary work in drawing off the original amounts from pay rolls, material issues, or voucher records has to be done in any event for the Auditor, and but little additional work in each office or shop is necessary to add the data for the new records. The totals sent to the statistical office should of course check with those sent to the Auditor, and this system of double figures is said to insure much greater accuracy in the accounts. The records described above meet with the hearty co-operation of both the traffic and operating departments. As their use and scope become better understood by the different officers, there is a more constant call for information (as regards both revenue and expense details), the result upon the service being marked as tending to produce efficiency and economy. The amount of information which can be furnished in a short time is surprising, and was not possible by any methods formerly in use.

There is one thing which is marked in the system of statistics to which we have referred, and that is the absence of anything like regular book-keeping. All the books kept are tabulated records and not accounts, thus employing printed and ruled forms as much as possible, and avoiding the necessity of much writing. It is found that a different class of clerical ability is necessary for this work, the methods being widely different from those used in ordinary accounts.

The development in mileage and complication of all details of our large roads call for a class of operators different from those of the past. The day has gone when the superintendent or manager of a line could keep well posted on all the details of the work. While now all details are expected to be personally supervised by some person, such officer has, as a rule, but the limited horizon of his own proper work. The manager, who is responsible for the whole, must know to some extent the detailed workings of all departments, and in no way can he obtain such an exact and searching knowledge of the relation and operation of all branches of the service, as by a system of accurate and intelligent statistics.

We have gone into the details of the system referred to rather fully, because, though not perhaps entirely developed nor perfect in all particulars, yet it seems a fair sample of a desirable collection and grouping of valuable information which could be easily followed by any of our larger roads.

#### Mayor Hewitt's Scheme for Rapid Transit.

Last Tuesday Mayor Hewitt sent to the Board of Aldermen a remarkable message, in which he comprehensively states his views of the policy to be adopted by the city with regard to its docks and streets, and submits an elaborat-



scheme for rapid transit. Some of the fundamental conditions of new rapid transit routes he states to be: The means of carrying passengers at 40 to 50 miles an hour. The route when laid out must be situated where the public want to go. The system made must be not only adequate to the present demand of traffic, but must make reasonable provision for the future. Advantage ought to be taken of existing conditions and means of transportation not yet fully or properly utilized. The work must be done at the lowest possible cost consistent with the best possible construction, so that the fares shall not exceed 5 cents.

The Mayor proposes that the line to be built shall connect with the two local tracks of the New York Central coming from the Harlem, near Fifty-fourth street, pass under the Grand Central station and the Fourth avenue tunnel to Thirty-second street, thence along the centre of Fourth avenue to Ninth street, along Ninth to Lafayette place, under Lafayette place and through a new street to the Elm street improvement and to the City Hall. The whole line would be in tunnel and open cutting and would have four tracks. At the upper end he would take the two local tracks under the Harlem and thus into the annexed district. Two of the tracks he would take west under Forty-sixth street, Broadway and Fifty-ninth street to the Boulevard, and thence four tracks could be carried in an open cut as far as needed. Below the City Hall he would have surface cars run down Broadway to the Battery. Auxiliary to this would be a surface system extending across the city from Grand and Centre streets to the Desbrosses ferry, down West by the Battery and up South, Wall and William streets to the City Hall terminus. Further, the west-side tracks of the New York Central should be connected with the proposed lines by a cross-town tunnel. The Mayor suggests and evidently prefers, as an alternative, a double track line, in a subway, down Broadway to the Battery, instead of turning the west-side lines to the Fourth avenue-Elm street line by a line through Forty-sixth street. It is proposed that the city build the roads, issuing three per cent. bonds for the purpose, and lease them to the New York Central at a rental of five per cent. on the cost for a period of 35 years. The difference of two per cent., reasonably invested, would pay off the bonds during the term of this first lease.

The New York Central Company has not been consulted in the matter, and it is not certain that it would be ready to enter into the Mayor's plan on the terms and conditions indicated, but the scheme is commendable in its financial and civic aspects. It is proposed that at the end of 35 years the city shall own, free of debt and unencumbered by any obligations, a fairly complete system of transportation, and that meanwhile the people shall have reaped the great benefits to flow from its use. Such a result would be novel and gratifying to the people of New York, and it seems as if they might be tempted to try to secure it. We think, however, that whatever route or plan is chosen, provision should be made for an unbroken journey from the Battery. The delay and annoyance of changing at the City Hall from one line of travel to another would be a great objection to the Mayor's first plan, and his alternative plan for a road under the whole length of Broadway is preferable. The objections to a tunnel merely because it is a tunnel we do not look upon as of paramount importance. An elevated road on a substantial viaduct, through the blocks, or along certain side streets, could be built with all necessary stability for the fast and heavy trains which are desirable, but the cost and difficulty of getting the necessary right of way would be very great, and such a road would not so readily connect with existing tracks above the Grand Central Station.

The necessity of a block system, even on roads doing only a moderate business, was clearly illustrated by a rear collision on the Fitchburg road in the great snow-storm of last week. A passenger train ran into the rear of a freight that had stopped at an unusual place and which was apparently protected according to rule. A man was back with a red light and says that he had torpedoes properly placed. The passenger runner, however, neither saw the light nor heard any torpedo. He is reported as saying:

"The wind was driving the snow in great sheets, completely enveloping the engine, train and track ahead, shutting off the view from the cab window several minutes at a time. We were running about 20 miles an hour, and had just passed through a big drift." He says that his head was outside the cab window when the engine struck a drift; the snow filled his eyes, nose and mouth. He drew his head inside, shook the snow off his face and eyes, and had just got on the watch again when the light from the red danger signal, at the switchman's shanty, only about 20 rods from the stalled freight, flashed up before him.

Though the circumstances are not all satisfactorily explained, this is apparently a pretty fair case of an accident happening in spite of the technical and very likely substantial performance of duty on the part of all concerned. It seems difficult to lay distinct blame on any one individual, and yet two persons were killed. Doubtless the freight men had been out a long time, so that we cannot find fault with them for sleeping in the caboose, whatever feeling one might have about placing himself in such a position. Surely we cannot fold our hands and say that these accidents are the result of unavoidable risks which must be taken in snow-storms. Moreover, these are not exceptional circumstances. Doubtless scores if not hundreds of trips have been made by snow-plows this winter on which, for considerable distances at a time, the pilot could not see a red signal. And if dependence upon torpedoes is ever questionable, it is when running through deep snow and while using scrapers and track brooms. The only really safe way to guard against rear

collisions under these circumstances is to "block" the trains from station to station.

New England and a large portion of the Middle states suffered last week from a severe storm of snow and wind which in New Hampshire is characterized as the worst in 35 years, and in Massachusetts as causing the worst blockade since 1866. Railroad traffic has been everywhere blocked, and in some cases suspended for 24 to 48 hours on important lines, and many derailments have occurred. On Wednesday and Wednesday night about a foot of snow fell, the ground being already covered by a foot or two in most of the territory mentioned. On Thursday and Friday there was a high wind accompanied by a very low temperature, so that the best work of all the snow-plows failed on many roads to keep the track open, drifts of several feet forming between trips. Where the interval was several hours, 10 and 15-ft. drifts were common. The Boston & Albany between Westfield and Albany was practically closed for one or two days, and west of Pittsfield there were 15 ft. drifts extending 700 ft. The Fitchburg had a rear collision at Williamstown, killing two trainmen, and a Connecticut River train ran into a gang of shovelers killing four of them. At Salem, Mass., a boy was blown from a passenger car platform, receiving fatal injuries. The Boston & Maine from Concord, north, was completely blocked at Warren, N. H., and other points. The Central Vermont and Passumpsic roads were in the same plight and smaller roads discontinued nearly all trains or gave up entirely. On the Central Vermont eleven locomotives were used to move a single train. All parts of Maine apparently suffered as badly as any other district, but news from there is meagre.

The New York Central had all its four tracks blocked for about 12 hours near Albany and had much trouble all the way from Poughkeepsie to Rochester. Fifteen carloads of cattle and hogs are said to have been frozen to death near Palmyra. The Erie had numerous trains blocked for hours. A Binghamton dispatch stated that only one train arrived there from New York in a space of 30 hours, and the north and south roads of the state as well as many lines in Pennsylvania had similar experiences. Altoona, Pa., and Frederick, Md., report serious delays to trains by bad drifts. At Oswego, N. Y., on Friday the wind blew 60 miles an hour, and the mercury indicated 10 deg. below zero. The Rome, Watertown & Ogdensburg was completely blocked in that region. One New York City reporter discovered the instructive fact that the reason the New York Central vestibule train lost more time than slower trains was because "the steam taken from the engine to heat the train far depletes its traction power," which was probably a purely gratuitous assumption on the part of the "journalist." Additional snow fell in New York state on Saturday and Sunday.

An experimental trip was made lately on the Chicago & Northwestern to test the efficiency of the system of continuous heating known as the Safety and introduced by the Safety Car Heating & Lighting Co. of New York. The train met with a severe blizzard in Iowa and was stuck in a snow bank for 17 hours, and was five days in running from Chicago to Des Moines and back, a total distance of 726 miles. The temperature outside was generally below zero, the minimum reading being 29° below and the average about 10° below. The engine was disconnected from the train on several occasions and the fires were then lit in the Baker heaters. During one day when the train was wholly heated by the Baker heater the thermometer in the cars ranged from 43° to 90°, a variation of 47°, which is certainly excessive. The thermometer when the train was connected with the engine and heated by steam varied from 63° to 100°, the latter reading being obtained from a thermometer in the position normally occupied by a passenger's feet.

On the last day of the trip, when the thermometer varied from 18° below to zero, the temperature of the cars varied only from 67° to 72° when heated only by steam from the engine. On one occasion the connection with the engine was cut off, and the fires were not, as usual, lit in the Baker heater. The temperature consequently fell from 76° to 36° in two hours and one half. This shows that even the large body of hot water in the pipes of the Baker system will not keep a car warm for any length of time in very cold weather.

Several minor mishaps appear to have occurred in the shape of frozen pipes, etc., and one hose blew off. The delays thereby occasioned would have been serious with regular trains, but it seems possible that further experience will enable these defects to be cured. It is hardly fair to expect that a totally novel system of heating will be a perfect success at the first systematic test made under very trying conditions. The trial, however, goes to show that a tolerably even temperature can be maintained inside the car even when the thermometer outside shows considerable fluctuations. In this respect the Safety system of continuous heating surpasses the Baker system, which embodies the experience of many winters.

The Baldwin Locomotive Works have recently completed their 9,000th engine. Such an enormous output from works is highly creditable to any firm, and is especially remarkable when it is borne in mind that the works were not originally laid out for building modern locomotives, and that they labor under some consequent disadvantages, the individual shops being separated by public streets, and many of them being at a considerable distance from the main office. However a good system of organization and a careful selection of officers and foremen will effect wonders even in the face of physical disadvantages, and this is probably the secret of the success of the Baldwin Locomotive Works, which from small beginnings have built up by far the largest business of the kind in the world. The

principle of taking the tried and experienced chiefs of department into partnership has worked well, and has doubtless contributed greatly to the success of the firm. A manufacturing business, especially when dealing with such complicated pieces of machinery as locomotives, requires great mechanical ability and experience in those at the helm, and this cannot be secured as long as the brains that actuate the whole concern are merely paid a salary, while those who reap the profits have only a pecuniary interest in their work and cannot understand its technical aspects. This is doubtless one reason why stock companies so often fail in manufacturing enterprises, while private firms, built up gradually by practical men, succeed in spite often of limited capital. The members of the successful private firm understand the work produced and can fully enter into and conceive the improvements by which good workmanship can be produced at a constantly decreasing price, and so meet competition and please their customers.

Signs, giving in large letters the destination and number of the car, are now attached to many of the sleeping cars on the Pennsylvania. Such signs are in universal use in England on all through trains, and on suburban and rapid transit trains are supplemented by a large sign on the bumper beam. In the latter form of sign, the destination is painted in black letters on a piece of ground glass, about 60 in. by 15 in., which is mounted in a wooden sash with rubber buffers to prevent breakage. Several of these sashes are carried in a suitable case on the bumper beam, each sash having a different destination painted on it. When running only the front sash is visible, giving the destination of the train for that particular journey. As the ground glass is illuminated at night by lamps placed at each end of the case, the destination of a train is clearly visible both day and night. The glare of the headlight would of course render such an arrangement hardly visible at night on an American engine, but this means of clearly indicating the destination of a train might be profitably used on the New York Elevated and some other roads where the engines do not carry headlights. A simple form of sign more suitable for cars is plain enameled board, bearing the destination in white letters on a deep blue ground. This is clearly visible, even in a very dim light, and does not get dirty or ever require repainting or repair, and such a device on every engine and car would be a very useful guide to passengers in a large union depot, when a dozen trains are about to start for as many destinations. It is to be hoped that many railroads will follow the lead of the Pennsylvania in this simple and inexpensive improvement, which will be a great convenience to inexperienced travelers, and save much waste of breath in asking questions of brakemen whose native tongue is apparently a patois of Choctaw.

There seems now a good prospect that the question of grade crossings in the city of Buffalo will shortly be settled. Plans, which have been prepared by Mr. C. W. Buckholz, Engineer of Bridges and Buildings of the Erie, have been accepted as satisfactory to all or most of the railroad companies interested. A committee on the part of the city is now in conference with the representatives of the railroad companies to the end of drafting a bill to be introduced into the Assembly at Albany, which will cover the legal technicalities in the case. In general terms the plan suggested is to concentrate the railroads approaching Buffalo from the north, south and east at a point somewhat east of Louisiana street. From that point they will run together some 4,800 ft. to a union passenger station, and to concentrated local freight depots. The streets crossed will be carried overhead by viaducts. West of the union depot the tracks of the New York Central will cross Washington and Main streets below grade, coming to the old grade about the foot of the Terrace. It is proposed also to widen Carroll street for convenient approach to the freight depots. The design is to form a terminal company, which shall carry out the improvements and build the new stations, interest on the stock of this company to be guaranteed by the railroads and the city. The proposed new union passenger station will have a frontage on Washington street of 340 ft., and a trainhouse 800 ft. long. The proposed trainhouse is 280 ft. in span, with 14 tracks and 8 platforms. The estimated cost of the passenger station is \$700,000.

In 1881 the Missouri Legislature passed a statute requiring that at all places where one railroad crossed another, there should be erected by both roads jointly, or by each separately, a depot, under a penalty, which goes to the school fund. A suit under this statute\* has just reached one stage in the United States Circuit Court at Kansas City, the Court holding that the statute is constitutional, and that it is no defence by the railroad against which the action is brought that the other road is not also sued. Neither is released from liability by the failure of the other. A third, and very serious matter, is also decided. The act provided that the penalty for failing to comply with the law should be \$25 for each day that the companies refused and neglected to build the depot. The railroad company claimed that but one penalty of \$25 was recoverable for the delinquency up to the time of bringing suit. But the Court decides in favor of the school fund, and that the railroad must pay that sum for each day there was no depot at the place. "It seems shocking" says the Judge (Brewer) "that a book account of penalties can be run up against a delinquent. In this case the penalties sued for amount to over \$30,000, and it is hard to believe that the legislature intended that such a burden of penalties should be cast upon a delinquent before its conduct is challenged and

\* State v. Kan. City, Ft. Scott & Gulf, 32 Fed. Rep., 722.



condemned in the courts. The authorities cited show that one penalty is alone recoverable, unless the language of the statute clearly expresses a contrary intent. I regret to say, and I do it with great hesitation, that such seems to be the intent of this section. It does not impose a penalty simply for a failure to construct a depot, but it says that for each day from and after a specified day the delinquent shall forfeit and pay the sum of \$25. Now, that language fails of meaning if, after a lapse of years of delinquency, but one penalty was recoverable. The delinquent would not be forfeiting and paying \$25 for each day of delinquency. Giving to this language that force which each word requires, it must be held that the legislature intended an accumulation of penalties." The judge further says that it seems to him a moral wrong to inflict such a heavy penalty, but the law must be enforced. The case has yet to be tried by a jury, and then there will be a chance to appeal to a higher tribunal, so it is certain that the school fund will have to wait for some little time for its money, as the railroad is not likely to pay over the sum of \$30,000 without a struggle, and in truth it should not.

The full report of the Inter-state Commerce Commission has just been issued by the government. Besides the report itself, which has been already noticed, the volume before us contains a series of appendices giving a summary of the work done by the Commission. It appears from this that the Commissioners received 58 petitions for relief under the fourth (short-haul) section, from 95 different companies, and that they made 20 temporary orders, relieving 43 carriers. Under the thirteenth section, 103 complaints were preferred before the 3d of December last. Of these 30 were heard and decided, 5 heard but not decided, in 11 the hearing was incomplete, 14 were withdrawn and settled by parties, 6 suspended by request of parties, 9 were at issue and assigned for hearing, 11 not yet assigned, 17 not at issue. A number of letters are given, bearing upon points which were not presented in actual complaints. It is interesting, as showing how much the Commission has done in settling disputed questions, to find that all but one of these letters were written before the end of June. Not the least interesting part of the appendices is that which gives a summary of answers to inquiries concerning long and short haul tariffs. Nearly 300 roads reply distinctly that they do not make tariffs in violation of the letter of the fourth section. Those roads which continue to make higher rates on interstate traffic for intermediate points, in almost all cases give detailed reasons for the exceptions to the law. The letters giving these reasons are published in full. We are much surprised to find how few these exceptions are, and how generally the officials express a purpose of doing away with them as soon as possible. The only thing which interferes with the completeness of these exhibits is, that, in some copies at any rate, the government binder has substituted 16 pages of the report on the finances for pp. 161-176 of the Inter-state Commerce report; and the careless reader, as he hurries over the paper, is a little startled to find that the proportion of the through rate of the Grand Rapids & Indiana R. R. does not apparently allow the superintendent of the mint at Philadelphia to make good a deficiency of bullion supposed to have been stolen. We await with interest the other side of the picture in the finance reports, where the missing pages will doubtless turn up. What if it should appear that the U. S. Treasury officials had decided to prorate with the Michigan Central on a basis of miles operated?

The London *Engineer* states that the British Admiralty contemplate improving Holyhead harbor at an expense of \$5,000,000. The removal of the dangerous Platters reef and the extension of the breakwater would make it one of the finest harbors in the world and render it a very convenient port of call for the Atlantic mail steamers, as Holyhead is only six hours by rail from London. It is understood that the Cunard and other steamship companies would much prefer calling at Holyhead instead of Queenstown, thus saving several hours and many transfers of passengers and mails between New York and London.

The Sewall system of continuous heating was recently severely tested on the Maine Central. The train leaving Skowhegan for Portland, Me., at 9:20 a. m., on the 27th, ran into a blizzard, and was stalled in a snow drift in a deep cut near Greene, where it remained for 23 hours. The train, however, was kept warm, and several gallons of coffee were boiled by the aid of a large tin boiler and a hose attached to the steam heating apparatus. A system of heating that not only keeps the cars warm in a blizzard, but boils coffee in addition, must be valuable, especially in a prohibition state.

A new and very simple form of valve-gear having but one eccentric for each side of the engine is being tried on the Burlington, Cedar Rapids & Northern. The Grimes valve-gear has been running for some time on stationary engines at Minneapolis, and the results of careful tests on a locomotive will be awaited with interest.

The recent explosion on the directors' car of the Delaware & Hudson Canal Co., by which one man was seriously injured and the ornamental wood-work of the car considerably damaged, was not caused by any defect in the McElroy system of continuous heating with which the car is fitted, but by a stoppage in the Baker system to which the McElroy system is attached.

The organization of the Wilmington & Sea Coast Railroad, and award of the contract for building it, were announced in the *Railroad Gazette* last week. The intention is to complete the road by next July and to open a sea-side hotel next

winter. The design is to attract to Wilmington, N. C., both summer and winter visitors. The winter climate is said to be preferred by many to that of Florida. The establishment of a winter resort so accessible will, no doubt, add to the growing tide of winter travel.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Powers, Liabilities and Regulation of Railroads.

By a section of the constitution of South Carolina all property subject to taxation is to be taxed according to its value. By another section it is declared that taxation is to be uniform. The Supreme Court decides that the first section does not limit the power of taxation to the taxation of property, and the state may, therefore, tax railroads according to their income, and that the second section does not invalidate a statute which requires all the railroad companies in the state to contribute to the salary and expenses of the state railroad commissioner.<sup>1</sup> In New Jersey the Supreme Court construes the act of April, 1884, as to taxation, and holds that the West Shore & Ontario Terminal is subject to be taxed thereunder.<sup>2</sup>

In Oregon an attorney who was also a director of an insolvent railroad company, was employed by third parties, who desired to reorganize the road to buy up the claims of plaintiffs, creditors of the company, which he did, not informing them of the scheme of reorganization. The Supreme Court rules that his position as director and attorney for the debtor company required him, in his dealings with plaintiffs, to exercise the utmost good faith; but, where they received all that their claims were worth, the fact that they were not informed as to the new scheme would not constitute constructive fraud on the part of the director.<sup>3</sup>

In Kansas the Supreme Court holds that a person who signs his name to the charter of a contemplated railroad company, sometimes before it is filed in the office of the Secretary of state, does not by that act alone assume a fiduciary relation towards the projected corporation. In this case the Court also held that the owners of a graded railroad bed can sell the same to a railroad company, whose officers, directors and stockholders are composed of the owners of the roadbed, and receive in payment therefor shares in the capital stock of the railroad company, at a time when those who sell the roadbed, and own and control the railroad company, are the absolute owners of all the stocks issued by the railroad company, and where the terms of sale, and the issue of stocks are matters of record on the books of the railroad company, and when the transaction occurs months before any other or additional stock is issued by the railroad company.<sup>4</sup>

By the South Carolina Constitution of 1868, art. 12, sec. 5, corporations may be formed under general laws, but such laws may, from time to time, be altered. By act of 1841, sec. 41, the charter of every corporation created under a general law, and every charter granted by act of the General Assembly, unless such act declares the contrary, is subject to amendment. The general railroad act of 1881 gives to a state officer the supervision of railroads in the state, and by sec. 41 thereof the burden of paying the officer's salary and expenses is imposed on all the railroad companies in the state. Under act of March, 1869, a railroad corporation obtained its charter, the constitution of 1868 and act of 1841 being then in force. The Supreme Court holds that, under these constitutional provisions, and the act of 1841, sec. 41, the General Assembly had unlimited power to amend the charter so obtained, provided the amendment did not go beyond regulation, supervision and control of the corporation, and that the general railroad act of 1881, sec. 41, was a valid amendment of the charter so obtained.<sup>5</sup>

In Kansas the Supreme Court holds constitutional the statute of the state making railroad companies liable for injuries received by the negligence of a "fellow-servant."<sup>6</sup>

An Arkansas statute entitled "An act to provide for the speedy settlement of claims for stock killed or injured by railroads," provides for the appointment of a board to assess the damages, by the parties, or by either party if the other should neglect to appoint an appraiser after being notified to do so. It also provides that, if either party refuse to abide by the decision of the board so constituted, and take the case before the courts, and shall not recover a more favorable judgment than the award of the board, such party shall be assessed for a reasonable attorney's fee for the opposing litigant. The Supreme Court decides that the act is unconstitutional, as the provision for the assessment of an attorney's fee is in the nature of a penalty upon the exercise of the constitutional right to have rights and liabilities determined in the courts, and as the legislature has no power to substitute boards of arbitration for the courts, and to make their awards obligatory, without the consent of the parties.<sup>7</sup>

##### Carriers of Goods and Injuries to Property.

In Pennsylvania the liability of a carrier for delivering goods to the wrong person is illustrated in the following case. An agent for soliciting orders, his employers in Philadelphia, the plaintiffs, reserving the right of rejection, sent in an order from L. Behrend at Washington. Plaintiffs, knowing no such person, but supposing A. Behrend, who had bought before, was intended, delivered the goods marked "A. Behrend" to a railroad company to transport from Philadelphia to Washington. When they arrived L. Behrend claimed them. A. Behrend, although still in Washington, was out of business. After ascertaining from the agent what kind of goods he had sold L. Behrend the defendant delivered the goods to L. Behrend. The Supreme Court decides that upon his insolvency and failure to pay for the goods, the railroad was liable to the plaintiffs for their value.<sup>8</sup>

In Minnesota the Supreme Court approves the doctrine that a carrier may limit his liability by contract except for negligence. A bill of lading of a horse provided that the railroad should not be liable for loss "by jumping from the cars." It appeared that the shipper had put the horse on the car, leaving the window open, through which it jumped and was killed. The Court finds the railroad not responsible.<sup>9</sup>

In a case in Iowa the evidence showed that a train which killed plaintiff's cattle struck them in the night; that it was a moonlight night; that there had been a storm the preceding day, which in many places knocked down the railroad fences, of which the trainmen were aware; that, from the position in which the cattle were found, the train must have been running at a high rate of speed. The Supreme Court holds that the evidence justified findings that the train was carelessly and negligently managed, and affirms a verdict against the company.<sup>10</sup>

In California a railroad is held liable for damages in setting fire by its engines to hay and grain in a lot. The negligence here was not in failing to use proper spark arresters, but in allowing piles of dry grass and weeds to accumulate and remain on the side of the track.<sup>11</sup> In Iowa the Supreme Court rules that under the Iowa code the fact that the plaintiff was guilty of negligently exposing certain stacks of hay by failing to protect them by plowing around them, and thus contributed to his own loss, is not material, as, under that statute, plaintiff's contributory negligence will not release defendant from liability for its own negligence.<sup>12</sup>

In Colorado the Supreme Court holds that the charter of Denver giving to the city council power to control its streets, to regulate the construction and operation of street railroads, and the running of locomotive engines and cars, and the location and construction of railroad tracks within the city, does not confer upon the council such authority to license the construction of railroad tracks lengthwise of its streets and thoroughfares generally, as to charge the purchasers of abutting property with notice that they may be so used by railroad companies for the running of their trains, in common with every other mode of conveyance. The use of the street for a railroad is a new use, for which property owners are entitled to be paid.<sup>13</sup>

The California Constitution provides that no right of way shall be appropriated to the use of any corporation not municipal, until compensation is made, irrespective of any benefits from the proposed improvements. The Supreme Court decides that the benefits supposed to result to the rest of a piece of land by the taking of part of it for the right of way for a railroad cannot be considered in a suit to determine the compensation to be paid the owner.<sup>14</sup>

##### Injuries to Passengers, Employees and Strangers.

In Iowa a passenger riding in a caboose car, seated in a chair, was thrown against the stove and hurt by the car being suddenly jolted by the coupling of another car to the train. The Supreme Court holds that the company is liable in damages, and as they had placed the chair in the car the plaintiff was not negligent in sitting in it instead of upon one of the fixed seats in the car.<sup>15</sup>

In the same state a man was riding in a caboose on a pass belonging to another. He was hurt by a jolt, as in the last case. The Supreme Court holds that he cannot recover damages, as he might have, had he been a passenger there who had paid his fare, but the Court adds that if the men moving the car had reason to know that the caboose was occupied, and yet moved it recklessly or negligently, and in such a manner as that injury to persons who might be in the caboose might reasonably be expected as the direct consequence thereof, the railroad would be liable.<sup>16</sup>

In Kansas a young man of 19 purchased a ticket to ride on a freight train some six miles. The train arrived at the station and stopped with the caboose near enough, and for a sufficient length of time, for him to walk to the caboose and get upon it. The conductor gave a signal for the train to start and leave the station, and the train then approached the station, moving slowly, and the engine passed the place where the passenger was standing on the station platform, and the first car, which was a stock car, with no conveniences for getting upon it except an iron ladder on its side, came immediately in front of him; and, without waiting for the caboose car to arrive, he attempted to jump upon the stock car while it was in motion, and fell between the stock car and the station platform and was injured. The Supreme Court rules that the railroad is not responsible for the injury.<sup>17</sup>

In Oregon a passenger was injured in a collision while the train was standing at a station. The engine was in charge of one who had been placed thereon to "learn the road" by a station agent who had no authority to hire men. He had been left in charge of the engine by the regular engineer, whose duty it was to attend to the engine. He was working in connection with the regular employees of the railroad company. The company claimed that the person in charge had no authority to move the train, and it was therefore not liable. The Supreme Court holds that, conceding the fault to be in the person handling the engine, yet the company was liable, by virtue of the fact that he was left by its employees in charge of the engine. In this case the passenger was a female who had left the train at the station with other passengers, who had been informed that the train would stop for dinner, but she had got back into the car before any of the others. The collision occurred before the others returned. The Supreme Court overrules the contention of the company's counsel that it was contributory negligence on her part to board the train before the trainman had announced that it was about to start.<sup>18</sup>

In Georgia an employee of the Port Royal Railroad Co. was killed in an accident while a train of that company was running over the tracks of the Augusta Railroad. His widow sued the latter road for damages. The Supreme Court rules that the latter company is liable if it failed to furnish a track over which the train might safely run. But if the injury was caused by a defect in the trucks of the cars of the company of which plaintiff's husband was an employee, she cannot recover from the other company. But if caused both by a defect in the trucks of the cars of the Port Royal and in the track of the Augusta Company, then she is entitled to recover in the proportion the defective track contributed to the injury.<sup>19</sup>

In Pennsylvania the Supreme Court holds that a train dispatcher is not a fellow servant with the engineer of a train, subject to his orders, within the meaning of the rule which exempts the master from responsibility for an injury received by an employee through the negligence of a fellow-servant.<sup>20</sup>

In Kansas one K. was an employee engaged on the track and in the yard of a railroad. He assisted in loading a car of iron rails, which were in a pile 10 feet high and 10 feet from the track. The manner of loading was to place rails as skids; one end on the top of the rail pile and the other on the middle of the track below. Two employees, who were on top of the pile, placed the rails on the skids, and allowed them to slide down until ten of them were so lowered. They would then wait until eight men, who were on the ground, would lift the rails and shove them into a car which was standing on the track nearby, and also until these men had stepped aside out of danger, when those on top would lower a like number of rails, which would in turn be placed in the car by the eight men on the ground. K. was one of the men engaged in placing the rails in the car, and after lifting the last rail of a certain lot, but before he had stepped aside, and without waiting the usual time to do so, the employees on top lowered another rail, which struck him with great force and killed him. K. was all the time in plain view of the men on the pile. The Supreme Court decides that the railroad is responsible in damages; that K. had a right to expect that the rail would not be lowered until he had warning to get out of the way.<sup>21</sup>

<sup>1</sup> Charlotte, C. & A. R. Co. v. Gibbs, 4 S. E. Rep., 49.

<sup>2</sup> State v. Bettle, 9 Cent. Rep., 659.

<sup>3</sup> Powell v. Willamette R. Co., 15 Pac. Rep., 663.

<sup>4</sup> St. L., F. & W. R. Co. v. Tiernan, 15 Pac. Rep., 514.

<sup>5</sup> Charlotte, C. & A. R. Co. v. Gibbs, 4 S. E. Rep., 49.

<sup>6</sup> Atchison, T. & S. F. R. Co. v. Kohler, 15 Pac. Rep., 567.

<sup>7</sup> St. Louis, Iron Mountain & S. Ry. Co. v. Williams, 5 S. W. Rep., 883.

<sup>8</sup> Wernbag v. P. W. & B. R. Co., 9 Cent. Rep., 603.

<sup>9</sup> Hutchison v. C. St. P. M. & O. R. Co., 35 N. W. Rep., 433.

<sup>10</sup> Baker v. C. B. & Q. R. Co., 35 N. W. Rep., 460.

<sup>11</sup> Steele v. Pac. Coast R. Co., 15 Pac. Rep., 851.

<sup>12</sup> West v. C. & N. W. R. Co., 35 N. W. Rep., 479.

<sup>13</sup> Denver Circle R. Co. v. Nestor, 15 Pac. Rep., 715.

<sup>14</sup> Pac. Coast R. Co. v. Porter, 15 Pac. Rep., 774.

<sup>15</sup> Quackenbush v. C. & N. W. Ry. Co., 35 N. W. Rep., 523.

<sup>16</sup> Way v. C. R. I. & P. R. Co., 35 N. W. Rep., 525.

<sup>17</sup> Way v. South. Kan. R. Co., 15 Pac. Rep., 601.

<sup>18</sup> Lakin v. Oregon Pac. R. Co., 15 Pac. Rep., 641.

<sup>19</sup> Killian v. Augusta & K. R. Co., 4 S. E. Rep., 165.

<sup>20</sup> Lewis, Receiver v. Selfert, 9 Cent. Rep., 751.

<sup>21</sup> A., T. & S. F. R. Co. v. Kohler, 15 Pac. Rep., 567.



## THE SCRAP HEAP.

## Around the Stove.

The recent reign of blizzards appears to have given many systems of continuous heating their first severe test, and travelers in snow-bound trains report many disagreeable and a few amusing instances of failure. One brakeman was asked by a passenger how the new system of steam was doing. "Very well, indeed," replied the brakeman, in a loud and confident tone; then lowering his voice he inquired, "Are you connected with this system?" "No, indeed," "Well," said the brakeman, "we've got the fires lit in the Baker heaters."

On another train the passengers in two particular cars complained bitterly of the cold and crowded forward into the other cars. A conductor explained that they were trying to heat these cars with the steam from a Baker heater in another car. This praiseworthy attempt at originality merits recognition, and while admirably suitable for Southern Florida, cannot be called an entire success when the thermometer is way below and the gale is bringing fragments of Dakota along at the rate of 70 miles an hour.

The inventors of flexible cast-iron hose, non-freezable traps, automatic temperature adjusters and other devices peculiar to the car heater of the future, state that this season they expect to gain the experience, and that next season those who survive will get the money.

## Tramways in the United Kingdom.

According to the article in the *Railway News*, there were at the commencement of last June 156 tramway systems in the United Kingdom, with 886 miles of line. Their construction and equipment had cost £13,123,723 or £14,812 (\$72,283) per mile; of this about 29 per cent. is in "loans and debentures," the balance in shares. Twenty-five thousand five hundred and one horses or 29 per mile are employed at a cost of \$151.28 each, 484 locomotives, at a cost of \$3,255 and 3,494 cars at a cost of \$913. The legal and parliamentary expenses have been at the rate of \$3,889 per mile.

## No More Derailments.

A Nebraska farmer has invented a little device to be used on cars and locomotives. It is thus described: "A pair of shoes or runners are attached to the cars between the wheels in such a manner that when the wheels are in position on the track the shoes are carried slightly raised above it. But in case either carriage should be thrown from the track, just as soon as the wheels drop down the shoe or runner is brought in contact with the rail, and as it is provided with a flange, it keeps the car from running off sideways. So long as one rail remains in position it is next to impossible for the car to leave the track more than four inches." It is said that a test of the apparatus is to be made on a 40-ton locomotive as soon as "one can be built on the new plan." It would be fun to stand beside the track and see the thing work. The arrangements for derailing the experimental locomotive are not described, nor are the names given of the courageous engine crew who will run it. The accident editor is already looking for another job.

## A Cable Road Accident.

A St. Paul dispatch of Jan. 27 says that a grip car, with its accompanying car filled with passengers, was coming down St. Anthony's Hill on Selby avenue, when in some way the grip man lost control of the car and the grip slipped from the cable. The cars at once started on a mad career down the hill and were only stopped by running off the track at a curve at the bottom of the hill, where they were overturned and smashed. Fourteen persons were injured, one of them fatally. A stove in the rear of the car did much injury to passengers.

## Baltimore &amp; Ohio Relief Association.

The annual report for the year ended Sept. 30, 1887, shows the total receipts as \$368,525, and the total disbursements as \$346,776. The total number of payments from the starting of the association, May 1, 1880, to Sept. 30, 1887, have been 67,560, and the disbursements to members for the same period have been \$1,716,536. The active membership on Sept. 30 was 23,155.

A bill has been introduced in the Maryland legislature to repeal the charter of this association. It is said that men discharged from the shops and other departments of the service of the road are dissatisfied with the provisions for adjusting their relations with the association on leaving the road; but it is added that the Knights of Labor are pushing the bill.

## Notes.

It is said that several hundred conductors, largely those of the Pennsylvania road, have sent to Congress protests against the passage of the proposed bill requiring conductors to be licensed.

Large tracts of Canadian Pacific lands granted by the Canadian government have been transferred to land companies. One of these, the Northwest Land Company, having been sued for taxes, and beaten, makes an appeal on the ground that the lands are held in trust for the railroad company, and, consequently, are exempt from taxation.

A committee of the United States Senate is considering changes in railroad locations in the city of Washington, and has heard arguments from the presidents of the Baltimore & Ohio and the Pennsylvania. The former desires leave to tunnel under Capitol Hill, so as to reach the roads entering the city from the south and to have a Union passenger station. The Pennsylvania claims that this would be unjust, as the Baltimore & Ohio had neglected to provide this connection heretofore, while the Pennsylvania had expended large sums of money in improvements, and should be allowed to enjoy the benefit of them. A committee of property owners urges that the tracks through important streets be discontinued, and the roads compelled to build elsewhere.

An ice gorge at St. Louis moved bodily down stream on Tuesday, and crushed or sank a number of steamers and other craft, doing many thousand dollars' damage.

Dispatches from Winnipeg tell of considerable loss of life on the line of the Canadian Pacific from snow slides. Mild weather has put a stop to all through Canadian Pacific trains, and it will probably be some time before traffic is resumed.

## Increased Leverage Necessary.

Puck believes that if George Westinghouse would invent an air brake that would stop a grocer's bill in half its own length, he would earn the gratitude of thousands of estimable people.

Our lively contemporary forgets that the feats of the automatic were accomplished only after shutting off steam. This necessary preliminary cannot be accomplished in an ordinary household if a buxom cook is pulling hard to keep that bill running and the grocer has two clerks pushing behind to keep the bill rolling up.

## Railroad Kings and the Sultan.

The English *Railway News* states that "it is reported that when Mr. Vanderbilt reached Constantinople in his yacht, the Sultan made him a proposition to build a system of Asiatic railways. Mr. Vanderbilt said his visit was one of

pleasure not business; that he knew nothing of the country, and was not prepared to deal with so large a question. The Sultan gathered information, and sent the papers to Egypt after Mr. Vanderbilt, and suggested that Mr. Gould might not be disinclined to consider the project. These proposals from the old East to the new West show the march of the times. It is to be hoped that Mr. Gould will take up the project and enlarge his experience, as he has hitherto done all his business with people who had money and exchanged them for Gould bonds. The Turks have lots of bonds, Asia Minor and otherwise, in lots to suit customers, but want to exchange them for Gould's gold. This will be a novel experience for Mr. Gould, and as the Sultan has a liking for steam yachts, and a wizard-like capacity for making gold disappear, leaving only worthless bonds behind, he and Mr. Gould are evidently kindred souls. Kismet! Bismillah!! Backseesh!!!

## General Railroad News.

## MEETINGS AND ANNOUNCEMENTS.

## Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago, Caldwell & Southern, special meeting, Tokeka, Neb., Feb. 16.

Chicago & Eastern Illinois, special meeting, Chicago, Ill., Feb. 10.

Delaware Lackawanna & Western, annual meeting, New York, Feb. 21.

Huntingdon & Broad Top Mountain, annual meeting, Philadelphia, Pa., Feb. 7.

Louisville & Nashville, special meeting, Louisville, Ky., Feb. 21.

Missouri Pacific, annual meeting, St. Louis, Mo., March 13.

New York, Susquehanna & Western, annual meeting, Jersey City, N. J., Feb. 23.

Peoria, Decatur & Evansville, annual meeting, Peoria, Ill., March 6.

Philadelphia & Erie, annual meeting, Philadelphia, Pa., Feb. 13.

St. Louis, Iron Mountain & Southern, annual meeting, St. Louis, Mo., March 13.

Schuylkill & Lehigh Valley, annual meeting, Philadelphia, Pa., Feb. 8.

United States Rolling Stock Company, annual meeting, New York City, Feb. 7.

Wheeling & Lake Erie, annual meeting, Toledo, O., Feb. 7.

## Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Institute of Mining Engineers will hold its 18th annual meeting in Boston, Mass., Feb. 21.

The Western Society of Engineers holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The New England Railway Club meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The Boston Society of Civil Engineers holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The Western Railway Club meets in Chicago the third Wednesday in each month.

The Engineers' Club of St. Louis meets the first and third Wednesday of each month till June.

The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The General Time Convention, spring meeting, will be held in New York, April 11.

The National Association of General Passenger and Ticket Agents holds its annual meeting in St. Augustine, Fla., on March 20.

The American Society of Civil Engineers holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

## Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Marquette, Houghton & Ontonagon, semi-annual, 3 per cent. on preferred stock, payable Feb. 15.

New York, Providence & Boston, quarterly, 2½ per cent., payable Feb. 10.

Pullman's Palace Car Co., quarterly, 2 per cent., payable Feb. 15.

Schuylkill Valley Navigation & Railroad, 6 per cent.

Wyoming Valley, quarterly, 1 per cent., payable Feb. 4.

## Illinois Society of Engineers and Surveyors.

The third annual meeting of the Illinois Society of Engineers and Surveyors convened in the Senate Chamber of the State House, at Springfield, Jan. 25. The first session was occupied with an address by the president, Prof. I. O. Baker, of the University of Illinois, and with the reports of the various officers and committees. The president's address outlined the necessity of improved methods in letting and erecting highway bridges, the importance of legislation requiring improved railroad appliances, and the need of an engineer on the Board of Railroad and Warehouse Commissioners.

J. M. Healy, Division Engineer I. C. R. R., Champaign, gave a paper on "Importance of Replacing Wooden Trestles with Iron and Stone."

Among papers read Thursday were: Progress of the Cairo Bridge over the Ohio River, including maps, description and methods, by S. F. Balcom, Asst. Engineer I. C. R. R., Champaign; Bridges and Viaducts for Cities, by D. W. Mead, City Engineer, Rockford; Specifications for Bridge Iron, by Prof. I. O. Baker, University of Illinois; Perpetuation of Monuments, T. S. McClanahan, Monmouth; Improved Highway Bridges, J. H. Burnham, Bloomington, and A Railroad Culvert, by E. A. Hill, Chief Engineer I. D. & S. R. R., Indianapolis, Ind.

In the afternoon, through the courtesy of Mr. Charles Hansel, Engineer Wabash R. R., a special train conveyed the society to the rolling mills and to other points of interest in the vicinity.

Friday's session included papers on Artesian Wells, by Prof. T. B. Comstock, University of Illinois, Champaign; Mine Surveying, by F. V. Alkire, Peterburg; Coal Fields of Colorado and New Mexico, by A. C. Brancher, Canon City, Colorado; Hygienic Engineering and Architecture, by G. N. Kreider, M. D., Springfield; The Township Boundary, by Z. A. Enos, Springfield; How to Secure Better Highway Bridges, by J. O. Wright, La Fayette, Ind.

The Cullom bill, establishing a Bureau of Public Works, was discussed and approved. Decisions of questions of practice in land surveying was made. An interesting feature of the meeting was the exhibit of drawings of engineering

structures made by the different members. A large addition to the membership was made, and the society is doing very creditable work.

The officers for 1888 are: President, C. G. Elliott, Tonica; Vice-President, D. W. Mead, Rockford; Executive Secretary and Treasurer, Prof. A. N. Talbot, Champaign; Recording Secretary, S. A. Bullard, Springfield; Executive Board, A. H. Bell, E. A. Hill and G. P. Ela. The next meeting will be held in Bloomington.

## Western Society of Engineers.

The annual meeting was held Jan. 3. In the absence of President Artlingstall, Mr. D. J. Whittemore presided. The annual report of the Secretary was read, and verbal reports were received from the Librarian and Trustees. The present membership of the society is 196. A recommendation was made by the Committee on Nominations that the annual dues be increased to \$8.50 for resident members and \$7.50 for non-resident members, with an initiation fee of \$5. A communication was received from Mr. J. A. L. Waddell, calling attention to his pamphlet on general specifications for highway bridges, with a request that the society take some action with reference to the reforms which he is seeking to accomplish. The matter was referred to the regular Committee on Bridges. The following officers were elected: President, A. Gottlieb; Vice-Presidents, J. W. Weston and O. Chanute; Secretary, L. E. Cooley; Treasurer, W. S. Bates; Librarian, G. A. N. Liljencrantz; Trustee, O. B. Green. The annual supper was partaken of by about 50 members and was very successful. At its conclusion the society, through Mr. Cregier, presented Mr. Moorehouse, the retiring Secretary, with a copy of the Encyclopedia Britannica.

## Montana Society of Civil Engineers.

This society held its first annual meeting and banquet at Helena, Mont., Jan. 21.

## Engineers' Club of St. Louis.

A regular meeting was held Jan. 18. Malvard A. Howe was elected a member. Prof. J. B. Johnson, Mr. Robert Moore and Mr. N. W. Eayrs were appointed a committee to take into consideration Mr. Waddell's recent pamphlet on Specifications for Highway Bridges, with a view to the Club endorsing the ideas of the author. Mr. Eayrs read a paper on the Improvement of Nantucket Harbor. The sandy coast rendered the work slow and difficult, as only the scouring effect of the tide was available. The original 6 ft. channel had been deepened 18 in., and it was hoped to get a mean depth of 12 ft. A paper was read by Prof. C. C. Brown on State Surveys, and Prof. Nipher showed a specimen of cast-iron cap burst by hydraulic pressure, caused by firing a rifle ball into a cylinder of water, the bottom of which was closed by the cap. Mr. Crow showed a radial draw-bar for cable car service.

## Engineers' Club of Philadelphia.

A regular meeting was held Jan. 21. The secretary presented, for Mr. C. H. Ott, an account of a peculiar case of transmission of vibrations and pulsations through structures. Serious vibrations were found to be occasioned in a building at one end of a solid row 400 ft. long, by the operation of a small engine at the other end of the row. A discussion followed on vibrations of buildings in which some remarkable instances were cited. One mill building in Massachusetts was mentioned where the vibration is so great as to cause nausea among new employes and water cannot be kept in a fire-bucket. Yet the building has stood this for ten years. Prof. Haupt submitted extracts from the report of Chief of Engineers, U. S. A., with reference to the theoretical operation of submerged jetties. His deduction was that the success of the attempts to maintain channels by submerged jetties is more or less problematical, and that it would be better to make a practical demonstration at some one harbor entrance before going ahead on the extended scale proposed by the War Department.

## American Society of Mechanical Engineers.

Announcement is made of the invitation which has been extended to the society to hold the Spring meeting of 1888 (XVIIth) in the city of Nashville, Tenn. This invitation has been accepted. The exact date has not been fixed, but it will probably occur in the end of April or beginning of May. To secure under the approved practice of this society the advance distribution of the papers among the members who will attend the convention, the last manuscripts for the meeting should be in hand before March 17, 1888. The secretary will be glad to have as many of the papers as possible in print before that date, particularly if they are illustrated. Council meetings for the scrutiny of applications for membership occur at the end of February and of March.

## New England Railroad Club.

The regular monthly meeting of the club will be held on Wednesday, Feb. 8, 1888, at 7:30 p. m. The subject for discussion is: "Wheels and axles, and their relation to the track."

## American Society of Civil Engineers.

At the regular meeting of the American Society of Civil Engineers, Wednesday evening, Feb. 1, the following persons were elected Members of the society: Daniel Seymour Brinsmade, Lorenzo Russell Clapp, Frank Paul Davis, Clarence Delafield, William Franklin Dennis, Edward Flad, Emil Gerber, George Blagden Hazlehurst, Allen Bogardus Hegeman, Alexander Joseph Swift, Elliott H. Wilson, and a Junior Member: Messrs. Kayajiro Kobayashi, Geo. E. Moulthrop, and Robert Ridgway.

The facts that two of the newly elected members were sons of present members, and that lately a grandson of one of the past presidents of the Society had been admitted into the Society, and that the Society was entering the second and third generation, were commented on by some of the members present.

The paper of the evening, a "Description of the Work of Constructing a Dam Across the Potomac River for Increasing the Water Supply of Washington, D. C.," by S. H. Chittenden, M. Am. Soc. C. E., was read by the author.

## Central Railway Club.

The annual meeting was held at Buffalo, Jan. 25. There was considerable discussion on the subject of interchange of cars, and it was the expressed sense of the meeting that any additional rules governing the interchange are unnecessary and out of place. A resolution was adopted condemning the action of the Erie, the Lackawanna, the Chicago & Atlantic, the Fitchburg and the Delaware & Hudson for combining on the adoption of additional rules, which, it was claimed, permit the interchange of disabled and un-safe cars.

Mr. Thomas Sutherland, of Detroit, Master Car-builder Chicago & Grand Trunk, was re-elected President, and Mr. Eugene Chamberlain, of Buffalo, foreman of car-repairs New York Central, was re-elected Secretary and Acting Treasurer. The next meeting of the Club will be held at the Tift House on Wednesday March 28.

## Wheel-Makers' Association.

The conference between members of the Wheel-Makers' Association and representatives of the Master Car-Builders' and Master Mechanics' Associations met recently in Chicago, in order to formulate a uniform specification for chilled car



wheels and a definite system of wheel mileage and guarantee that will meet the approval of the several associations and be recognized as the basis upon which chilled car wheels will be sold.

Messrs. J. N. Lauder and J. N. Barr were in attendance as representatives of the Master Car-Builders' and Master Mechanics' Associations, and Messrs. Hon. W. H. Barnum, J. H. Bass and W. W. Snow represented the wheel makers. The meeting was private, but it is understood that after much discussion no definite conclusions were arrived at, though portions of the proposed standard specification for wheels were adopted. The chief discussion was over the question of guarantee, and it is proposed to drop the guarantee and sell the wheels at a given price per 1,000 miles run. The difference between the earnings which the wheels make and the price of old wheels will represent the profit or loss of the maker.

#### PERSONAL.

—General Manager Isaac Reynolds, of the Valley Railroad (Ohio), has tendered his resignation.

—F. W. Gerecke, of Newburg, N. Y., has been appointed Chief Engineer of the city of Chicago by Mayor Roche.

—Elijah Smith has been invited to take the Presidency of the New York & Boston Rapid Transit Co., and now has the matter under consideration.

—Major C. W. Raymond, Corps of Engineers, U. S. A., has been appointed Engineer Commissioner of the District of Columbia, to relieve Col. William Ludlow, U. S. A.

—John M. Egan has resigned the position of General Superintendent of the St. Paul, Minneapolis & Manitoba, to take effect Feb. 1. Mr. Egan has held this position since Sept. 1, 1886.

—Robert Boag, Assistant Mechanical Superintendent of the Grand Trunk, died last week at Stratford. He had been connected with the road five years, and was formerly on the Midland, of England.

—Mr. H. O. Northcote, who is about to sail for Europe, has resigned from the board of directors of the Cedar Falls & Minnesota to enable a member of the Bondholders' Committee to be elected.

—Morris E. Ward, for several years agent for the Allen Paper Car-Wheel Co. at Chicago, has been appointed General Manager of the Wickes Refrigerator Co., with headquarters at Chicago.

—George T. Jarvis, who has been appointed Superintendent of the new Duluth, South Shore & Atlantic, is 28 years of age, a graduate of the Toronto University, and has had special training in mechanical engineering at the Boston Institute of Technology. He has been connected with the Pennsylvania road, and has of late been Division Superintendent on the Mexican Central.

—E. B. Thomas, who has just been elected Second Vice-President of the New York, Lake Erie & Western, has been Vice-President and General Manager of the Richmond & Danville since September, 1885, and also General Manager of the Georgia Pacific since October of the same year. For several years previous to 1885 he was General Manager of the Cleveland, Columbus, Cincinnati & Indianapolis. He was a member of the General Time Convention Committee that formulated the uniform code of train rules.

—Cyrus Wakefield died suddenly at Wakefield, Jan. 25, of heart disease, it is supposed. Mr. Wakefield was born Oct. 20, 1833. Early in life he became associated with his uncle, Cyrus Wakefield, Sr., in Boston, in the East India trade. In 1865 he went to Singapore as manager of the East India branch of the house. He remained there until 1873, when the death of his uncle recalled him to this country, and he went to Wakefield, where he has since resided, superintending the large manufacturing interests of the Wakefield Rattan Company. During the years intervening he had served both as president and treasurer of the company, and was acting in the latter capacity at the time of his death. He had been for a long time president of the Citizens' Gas Light Company, president of the Wakefield Lecture Association, trustee of the Public Library, chairman of the board of investment of the Wakefield Savings Bank, and had recently been re-elected president of the Wakefield Board of Trade. He was also a director of the China Marine and of the Boston Marine Insurance companies of Boston, a director of the Boston National Bank, and also connected in the same capacity with several other Boston financial and manufacturing institutions. He carried also a large trade in sugar, hemp, rattans and other East India products.

#### ELECTIONS AND APPOINTMENTS.

**Baltimore & Ohio.**—Captain Henry A. Spies has been appointed General Agent of this company in Wheeling, W. Va.

**Boston & Lowell.**—T. Jefferson Coolidge has been elected President in place of F. L. Higginson, who resigned because of doubts as to his eligibility.

**Cedar Falls & Minnesota.**—William S. Tod has been elected a director of this company to succeed C. W. Benson, resigned.

**Chicago & Eastern Illinois.**—The directors of the consolidated company are: R. P. Flower, Benjamin Brewster, Heber R. Bishop, Henry Seibert, Richard M. Hoe and Ogden Mills, New York; H. H. Stevens and George H. Ball, Boston; H. H. Porter and O. S. Lyford, Chicago, and J. G. English, Danville, Ill. H. H. Porter, of Chicago, is President.

**Chicago, St. Paul & Kansas City.**—Raymond Du Fay has been appointed Second Vice-President. J. M. Egan has been appointed General Manager.

**Coudersport & Port Allegheny.**—The following directors were elected last week: C. S. Carey, F. N. Root, A. G. Olmsted, Isaac Benson, B. D. Hamlin, F. H. Arnold, W. K. Jones, James L. Knox. The following officers were also elected: President, F. W. Kuox; Treasurer, Miles W. Barse; Secretary, A. B. Mann.

**Dallas & New Orleans.**—The incorporators of this company are: J. Duncan Smith, Edinburgh, Scotland; S. J. Menzies, Liverpool; G. P. Morosini, New York, and James B. Simpson, Dallas, Texas. The last named gentleman is President.

**Denver, Texas & Fort Worth.**—George Ady, of Denver, has been appointed General Passenger and Ticket Agent of this road.

**Duluth, South Shore & Atlantic.**—S. F. Boyd, late of the Minneapolis & St. Louis, has been appointed General Passenger and Ticket Agent, with office at Marquette, Mich. George T. Jarvis has been appointed Superintendent.

**East & West Alabama.**—Jefferson M. Levy has been elected president of this company.

**Fitchburg.**—At the annual meeting held in Boston this week, the old Board of Directors were re-elected as follows: Elijah B. Phillips, Robert Codman, Charles A. Welch, Boston; Rodney Wallace, Charles T. Crocker, Fitchburg, Mass.; Seth Bemis, Newton and Franklin W. Poor, Somerville, Mass.

**Florida Railway & Navigation.**—Walter E. Downing has been appointed General Western Freight and Passenger Agent, headquarters at Cincinnati, vice N. S. Pennington, promoted.

**Fort Worth & Denver City.**—George A. Sanderson has been appointed General Freight Agent.

**Gulf, Colorado & Santa Fe.**—C. M. Baker has been appointed Division Master Mechanic in charge of Locomotive and Car Departments at Fort Worth and Weatherford; headquarters at Cleburne.

**Houston & Texas Central.**—A. F. McCord has been appointed Traveling Passenger Agent, headquarters at Dallas, Texas.

**Little Miami.**—At the annual meeting held in Cincinnati this week, the following directors were elected: A. D. Bullock, Henry Hanna, Frank J. Jones, John Mitchell, L. B. Harrison, Joseph H. Rogers, William Worthington, Cincinnati; A. S. Frazier, Xenia, O.; Thomas D. Wesley, Pittsburg, Pa.; August Trum, John L. Whetstone and Lewis Van Antwerp.

**Kansas City & Bonner Springs Rapid Transit.**—This company, recently reported, has elected the following directors: D. E. Cornell, J. K. P. Barker, Philo M. Clark, D. R. Emmons, Winfield Freeman, W. A. Simpson, H. S. Swingle, J. F. Williamson, W. H. Bridgens, James D. Husted and Stephen S. Kirby, of Kansas City, Kan. W. A. Simpson, Kansas City, was elected President.

**Kansas City, Fort Scott & Gulf.**—O. G. Parsley, Jr., has been appointed Southeastern Freight Agent, with headquarters at Atlanta, Ga.

**Kansas, Texas & Mexican.**—The directors of this new Kansas company are: George Leis, Edwin Brown, S. W. Sawyer, J. D. Bowersock, T. J. Steinbarger, of Lawrence; W. A. Morton, Leavenworth; F. D. Mills and C. D. Walker, Atchison; Levi Wilhelm, of Winchester; George H. Clark, C. C. Olmsted, Morris E. Jones, David T. Keeler and W. H. Henry, of Olathe.

**Minneapolis & St. Louis.**—E. A. Whitaker has been appointed General Passenger and Ticket Agent, vice S. F. Boyd, resigned.

**Montgomery & Florida.**—Col. B. Denham is now Vice-President and General Superintendent; headquarters at Montgomery, Ala.

**Natchez, Jackson & Columbus.**—H. J. Rockwell has been appointed Assistant to the General Manager. L. R. Martin has been appointed Chief Train Dispatcher.

**New York Central & Hudson River.**—W. S. Baldwin has been appointed General Agent for the Pacific Coast. He will also represent the Michigan Central, Lake Shore & Michigan Southern, and the Cleveland, Columbus, Cincinnati & Indianapolis.

**New York, Lake Erie & Western.**—E. B. Thomas has been appointed Second Vice-President, in charge of the New York, Pennsylvania & Ohio, with headquarters at Cleveland.

**Orange Belt Investment Company.**—H. O. Armour, of New York, and E. E. Dennison, of Philadelphia, have been elected directors.

**Pennsylvania.**—James W. Sanford has been appointed Master Mechanic at the Meadow shops, vice L. A. Bosdevex, deceased.

**Pittsburgh, Chautauqua & Lake Erie.**—The following officers have been elected: President, W. Ives Parvin, Philadelphia; Vice-President, George P. Orr; Secretary, F. Mack, of Warren, Pa.

**Richmond & Danville.**—Peyton Randolph has been appointed General Manager, vice E. B. Thomas, resigned.

**Rio Grande & Utah.**—The incorporators of this road, recently reported, are: Henry L. Waldo, Santa Fe; Benjamin L. Jones, W. B. Childers, Albuquerque, N. Mex., and Benjamin L. Cook, of Chicago. The directors are John W. Conley, of Chicago; William R. Merriam and Edgar C. Long, of St. Paul, Minn.; Francis W. Carpenter, of Providence, R. I.; Cyrus S. Clapp, of Binghamton, N. Y.; Budd Doble, of Chicago; Rudolph Hoberland, of Cabezon, N. M.; and the four incorporators.

The directors of this company are: John W. Conley, of Chicago; Wm. Merriam and Edgar C. Long, of St. Paul; F. M. Carpenter, of Providence, R. I.; C. W. Clapp, of Binghamton, N. Y.; Budd Doble, of Chicago; R. Haberman, of New Mexico; H. H. Waldo, of San Francisco; B. L. Jones and W. B. Childers, of Albuquerque, and B. L. Cox, of Chicago.

**Sandusky, Mansfield & Newark.**—The following directors have been elected: A. H. Moss, J. O. Moss, A. C. Moss and E. B. Sadler, of Sandusky; Robert Garrett and Samuel L. Spencer, of Baltimore; L. T. Tracy, of Mansfield; John Gardiner and E. G. Gardiner, of Newark. The directors elected the following officers: President, John Gardiner; Secretary and Treasurer, J. O. Moss.

**Tennessee Midland.**—At the annual meeting the following directors were elected: A. S. Buford, T. C. Leake, Jr., Joseph T. Gray, R. H. Temple, Richmond, Va.; B. A. Van Schaick, Philadelphia; and W. D. Bethell, G. W. McRae, R. L. Taylor and R. S. Bruce, of Memphis.

**Texas & Pacific.**—William J. Walker has been appointed Southeastern Passenger and Freight Agent, with headquarters in Atlanta, Ga., vice McD. Nathan, transferred to St. Louis, Mo.

G. McD. Nathan has been appointed Freight Agent in St. Louis, Mo.

**Union Stock Yards & Transit Co.**—The following directors have been elected: N. Thayer, John B. Sherman, John Newell, M. Huggitt, J. N. McCullough, E. T. Jeffrey, R. R. Cable, H. B. S. one, J. C. McMullen. The following officers were also chosen: President, N. Thayer, Boston; Vice-President and General Manager, John B. Sherman, Chicago; Secretary and Treasurer, George T. Williams; General Superintendent, Elmer Washburn.

**Virginia & North Carolina Construction Co.**—The incorporators of this company are: D. F. Houston, H. S. Trout, P. L. Terry, E. H. Stewart, J. M. Gambill, S. F. Tyler, C. J. Aragin, S. A. Crozen, H. C. Lester, John D. Spencer, John A. Brown, C. B. Bryant, H. F. Fries, R. J. Reynolds, J. C. Buxton, C. B. Watson, C. H. Fogee and James A. Gray.

**Western New York & Pennsylvania.**—James McCullough has been appointed Traveling Auditor, vice H. C. Walker, resigned.

**Williamsville, Marborough & Buffalo.**—The incorporators of this New York company are: William B. Sirret, James F. Gluck, Charles A. Pooley, Leonard Dodge, J. B. Stafford, Christopher Smith, William H. Slade, David R. Fogelsonger and Henry Fogelsonger, of Buffalo, and James Chalmers and John Long, of Williamsville.

**Youngstown & Buffalo.**—The officers of this newly formed company are as follows: President, S. Park Baker; Vice-President, A. H. Dutton; Secretary, William Wilkeson; Treasurer, L. P. Gillette.

#### OLD AND NEW ROADS.

**Allegheny Valley.**—The gross and net earnings for the month of December and for the year are as follows:

	December	1887	1886	Year to Dec. 31—	1887	1886
Gross earn.....	\$179,048	\$136,799	\$2,029,108	\$1,812,729		
Oper. exps.....	105,321	92,209	1,231,339	1,131,469		
Net earn.....	\$73,727	\$64,590	\$797,769	\$681,260		

The gross earnings for December show an increase of \$22,249, or 14.1 per cent., and the net earnings show the same per cent. of increase. The gross earnings for the twelve months amounted to \$216,379, or 11.9 per cent., while the increase in net earnings amounted to 16.1 per cent.

**Anniston & Atlantic.**—It is stated that this narrow gauge road will be absorbed by the Central of Georgia, and that it will be changed to standard gauge and extended from Sylacauga, Ala., to Blocton and Talladega, Ala.

**Atlanta & Florida.**—The location of this road has been completed as far as Fort Valley, Ga., and the grading will reach that place about Feb. 15. The road is in operation between Atlanta and Waleysville, about 31 miles, and it will be completed as far as Fort Valley by May.

**Boston & Maine.**—It is rumored that this company will lay a third track from Boston to Oak Grove (Malden) in the spring, and that the repair and machine shops will be removed to Oak Grove from Charlestown.

**California & Oregon.**—Severe rains on the line of this lately completed road for several weeks past have caused serious landslides. It is reported that the track for about 100 miles has been so badly washed that several weeks will be required to make repairs. The worst slides are on the divisions between the Delta and the 18th crossing of the Sacramento River, and between Hornbrook and Ashland.

**Canadian Pacific.**—The earnings of this company for the year ending Dec. 31 are as follows:

	1887	1886	Inc. or Dec.	P. c.
Gross earnings....	\$11,606,412	\$10,681,802	\$1,524,610	15.1
Operating expenses	8,102,294	6,378,317	1,723,977	27.1
Net earnings....	\$3,504,118	\$3,703,485	D. \$199,367	5.4

**Central Missouri.**—The surveying corps has reached Fayette, Howard County, Mo., and will continue working westward. The present route is by way of Rocheport from Columbia. The steepest grade is 35 ft. per mile.

**Chesapeake & Ohio.**—A Cincinnati dispatch says that plans have been completed for taking this road out of the hands of the Receiver and making M. E. Ingalls, of the Cincinnati, Indianapolis, St. Louis & Chicago, President.

**Chicago, Burlington & Quincy.**—It is reported from Boston that the company will build 400 miles of new road in Nebraska this year. President Perkins is making contracts in Chicago.

**Chicago, Caldwell & Southern.**—The directors of this company have called a meeting of the stockholders to be held in Topeka, Kan., on Feb. 16, for the approval of the lease to the Chicago, Kansas & Nebraska.

**Chicago & Eastern Illinois.**—The stock issued by the new consolidated company amounts to \$3,000,000 preferred and \$5,000,000 common, \$2,000,000 of the common being held in the treasury. No additional stock can be issued except on the building or acquisition of new road and then not over \$10,000 preferred and \$15,000 common per mile. The road extends from Chicago to Terre Haute, Ind.; Danville to Tuscola, and Wellington to Cissina Park, Ill., about 370 miles.

**Chicago, Hannibal & Springfield.**—Arrangements have been made to extend this road from Springfield, Mo., to Little Rock, Ark. It is understood that the extension will be controlled by the Chicago, Burlington & Quincy.

**Chicago, Kalamazoo & Hastings.**—The engineers have completed the survey from Hastings to Portland, Mich., on the proposed line to Saginaw, which they expect to reach before spring.

**Chicago, Madison & Northern.**—The last rail on this road, from Freeport, Ill., to Madison, Wis., about 60 miles, was laid last week. The two ends of the road met south of the tunnel near Belleville, Ill.

**Chicago, Milwaukee & St. Paul.**—It is reported that the rails are being delivered at Spencer, Ia., for the purpose of building a line from Spencer to Fonda, and thence to Sioux City. It is also stated that the company has bought the Des Moines & Northwestern narrow gauge road.

**Chicago, St. Paul & Kansas City.**—This company has made arrangements by which it will use the tracks of the Kansas City, Wyandotte & Northwestern from Leavenworth to Kansas City.

**Cincinnati, Huntsville & Birmingham.**—A survey has been made and right of way obtained for this company, which was incorporated last spring, and it is believed that the work of construction will be commenced immediately. Already \$400,000 has been subscribed, and several counties yet to vote will make it \$600,000. The southern terminus will be either Brunswick or Birmingham, Ga.

**Cincinnati, New Orleans & Texas Pacific.**—The name of Summit station has been changed to Pine Knot.

**Columbus & Eastern.**—Cross petitions, asking that this road be sold under decree, have been filed by Shaw, Stearns & Hoyer, the contractors who built the extension of the road, and who hold \$650,000 of the Receiver's certificates, and who have been made defendants in a suit brought by John E. Woodruff against the Columbus & Eastern.

**Columbus & Western.**—The contract for this road from Sylacauga, Ala., 20 miles west has been transferred to Mr. Watt, of Columbus, Ga.

**Covington & Macon.**—This road will be completed to Madison, Ga., within two months, and by June 1 it will be through to Athens, where it will connect with the North-eastern of Georgia and the Seaboard & Roanoke, which is



being extended to that point. Branches are also being built from Monticello eastward to Eatonton, connecting with the Central of Georgia, from Monticello west to Griffin and north-west through Covington to Atlanta. The road is standard gauge, laid with 56 lb. rails, and is bonded for \$12,000 a mile. Alexander Brown & Sons, of Baltimore, have arranged to take the bonds as they are issued upon the completion of each ten miles of road.

**Dallas & New Orleans.**—The charter of this company has been filed in Texas to build a road from Fort Worth to a point in Newton County, near the Louisiana line, thence to New Orleans.

**Dayton, Fort Wayne & Chicago.**—The application for a Receiver for this road has been postponed till Feb. 4. Judge Harnon, representing New York parties, claiming that he understood that the case had been postponed to that date. It is hoped that an adjustment will be reached by which the company will be able to pay off its indebtedness.

**Dennison & Sherman.**—The surveys for this road, lately chartered in Texas, are now in progress.

**Detroit, Bay City & Alpena.**—It is reported that this road will be extended from Alpena to Cheboygan, in the northern part of the state, near the Straits of Mackinac.

**Finleyville Short Line.**—This is a proposed road to run from Finleyville on the Baltimore & Ohio to Monongahela City, about seven miles. A force of men is at work, but it is believed that only sufficient work will be done to hold the charter and right of way.

**Florida Railway & Navigation.**—A plan for the reorganization of this company will be submitted to bond and stockholders shortly. The plan provides for a bonded debt of about \$5,000 per mile and an assessment of 3 per cent on both common and preferred stock, for which new preferred stock will be given. This arrangement would leave the company with a surplus to improve the road.

**Galveston Air Line.**—Engineers are now locating the line of this road, mentioned last week, which is projected to extend from Galveston, Tex., via Houston, Montgomery, Madisonville and Centerville to Paris, Tex., with branches to Dallas and Fort Worth. Grading is expected to begin in April. The capital is \$2,000,000. The projectors are the same people who built the Gulf, Colorado & Santa Fe. W. L. Moody, Galveston, is President.

**Georgia, Carolina & Northern.**—The road will reach Athens, Ga., in the spring and continue towards Atlanta. About 1,000 men are at work near Chester, S. C. T. W. Powell, Athens, Ga., has the contract from Athens to the Middle Oconee River.

**Georgia, Florida & Southern.**—Work on this road has been seriously delayed by the heavy rains lately. One hundred and twenty bonds of \$1,000 each were recently placed on sale in Macon, of which 63 have been sold, and the rest will probably be sold in a few days.

**Grand Trunk.**—The Hamilton & Northwestern passed under control of the Grand Trunk Jan. 25, new directors having been elected. It is generally understood that the transfer includes all the branches of the Hamilton & Northwestern.

**Indiana, Bloomington & Western.**—It is now said that several official circulars have been issued by the Ohio, Indiana & Western, the name of the consolidated company, announcing the change of administration. This disproves the report that the consolidation of this road and the Cincinnati, Sandusky & Cleveland had been declared off, although some questions still remain to be settled.

The dispatch from Springfield, O., stating that the consolidation of the Indiana, Bloomington & Western and Cincinnati, Sandusky & Cleveland roads was off, and that the latter refused to proceed further, is authoritatively denied by President Farwell of the last named road.

**Indiana & Lake Michigan.**—It is said that this company is now financially prepared to build its road, and that work will commence early in the spring. The road was chartered last summer, and the proposed line extends from South Bend, St. Joseph County, Ind., northwest through Berrien County, Mich., to Buchanan, and thence to St. Joseph and Benton Harbor, a distance of about 40 miles.

**Illinois Central.**—It is stated that the building of a branch to St. Louis by this company has been decided upon, but that the point at which it shall leave the main line is yet unsettled, Champaign, Tuscola and Mattoon being under consideration.

**Jefferson City & Southwestern.**—Grading will commence on this road about the middle of April.

**Kansas City & Sabine Pass.**—Contracts have been let for the line between Kansas City and Pierce City, Mo., and work will be rapidly pushed after the meeting of the directors on Feb. 9, when an error in the reading of the company's bonds, lately issued to the amount of \$2,500,000, will be rectified and an additional \$500,000 of first-mortgage bonds for a car equipment fund will be issued. At Pierce City the road will probably connect with the Texarkana & Northern road.

**Kansas City, Memphis & Birmingham.**—The branch between Amory and Aberdeen, Miss., about 14 miles long, has been completed, and, it is thought, will be extended to Selma and Pensacola, using the route of the Memphis, Aberdeen & Selma, which was partially constructed.

**Kansas, Texas & Mexican.**—Articles of incorporation have been filed in Kansas to build a road from Kansas City, Mo., through the counties of Johnson, Douglas, Osage, Lyon, Morris, Chase, Marion, McPherson, Harvey, Sedgwick, Reno, Kingman, Barber, Comanche and Clarke, in the state of Kansas, then southwest through the public lands in Indian Territory, the Pan Handle of Texas, and New Mexico to El Paso, a distance of 1,200 miles. It is also proposed to construct branches from Medicine Lodge, Barber County, through Barber, Comanche, Clarke, Meade, Seward, Stevens, and Morton counties, in Kansas, southwest through Colorado and New Mexico to Albuquerque, about 500 miles; through Gray, Haskell and Stanton, in Kansas, about 60 miles; from Kansas City through the counties of Wyandotte, Leavenworth, Jefferson, Atchison and Brown, in Kansas, to Falls City, Neb., about 150 miles; from Lawrence, Kan., through Douglas and Leavenworth counties to Leavenworth, and from a point between the counties of Wyandotte and Leavenworth through Leavenworth, Jefferson, Shawnee, Wabaunsee and Morris counties. The capital stock is \$50,000,000.

**Leavenworth & Denver Short Line.**—Nearly 300 miles of this road have been surveyed from Stockdale, Kan., and the engineers locating the line will begin the survey from Leavenworth to the Blue River. Two hundred and fifty miles of the road will be in Kansas and 140 in Colorado.

**Long Island.**—The statement of this company for the year ending Sept. 30, 1887, is as follows: Gross earnings,

\$3,197,907; operating expenses, 56 1/2 per cent. of earnings, \$1,808,708; net earnings, \$1,389,039; interest, taxes and rentals, \$708,083; dividends, 4 per cent., \$430,000; paid for personal injuries, \$48,198; surplus, \$231,833. The general balance sheet shows that the cash on hand amounts to \$107,260; surplus, \$1,059,366.

**Longview, Galveston & Sabine.**—A decree has been granted permitting the sale of this Texas railroad for the benefit of the bondholders. Judge S. D. Wood, of Tyler, has been appointed master to effect the sale.

**Los Angeles, Long Beach & Ocean.**—The location of this road is completed, and construction work has begun at Long Beach. The line starts from a point three miles south of the Atchison, Topeka & Santa Fe station in Los Angeles, and runs through Clearwater to Alhambra Bay, whence it follows the coast to Long Beach. The distance is 24 miles. It is said that the Santa Fe will control the road, and will establish a freight station at Alhambra Bay, dredging the bay to make the wharf accessible to large vessels.

**Louisville & Nashville.**—The permanent location of a route to Huntsville, Ala., has been made from Boyle's Gap, on the South & North Division, to William's Gap, in the red fossil iron ore region, dividing Big Spring Valley from Brown's Valley, a distance of 57 miles. This branch is called the Huntsville Branch, and has its initial point at Bessemer, that part of it between Bessemer and Boyle's Gap having been completed.

**Meriden & Waterbury.**—The first trip over this new Connecticut road was made last week. It is 17 miles long.

**Mexican National.**—The company has ordered 12 passenger and 4 combination cars, of the Billmeyer and Small Co., York, Pa., and a similar number from the St. Charles Car Co., St. Charles, Mo.

**Midland Peninsular.**—Five towns of Kewaunee County, Wis., have deposited bonds to the amount of \$21,000 in Green Bay to aid this projected road. A joint deposit of stock of the same amount was also made on behalf of the company.

**Missouri Pacific.**—The tracklayers of this road have passed Carrollton, Dallas County, and are pushing on toward Grapevine, Tarrant County. The force of tracklayers will be largely increased next week.

**Montgomery & Florida.**—This road, which extends from Montgomery, Ala., to Live Oak, Suwannee County, Fla., will be extended to Chattahoochee, Gadsden County, Fla., and north from Montgomery some 60 miles into valuable coal lands. N. T. Sprague, Brooklyn, N. Y., is president.

**Nantasket Beach.**—The Board of Railroad Commissioners of Massachusetts has ratified the foreclosure of the road to Arthur W. Morse, and authorizes him to lease or sell it to the Old Colony, but does not require the Old Colony to operate it during the winter season.

**Nebraska Southern.**—Articles of incorporation have been filed in Nebraska for the purpose of building a road from Superior, Neb., through Nuckolls, Webster, Franklin, Harlan, Phelps, Gosper, Frontier, Lincoln, Hayes, Keith and Cheyenne counties to the western part of the state, with the right to build branch lines. The capital stock is \$6,000,000. The incorporators are officials of the Missouri Pacific, and the road will parallel a portion of the Chicago, Burlington & Quincy.

**New Roads.**—It is proposed to build a road in Nebraska, from Crete, Saline County, via Tobias, Belvidere, Friedensburg and Desbler to Superior, Nuckolls County.

A survey has been made and the right of way secured for a road from Hebron, N. Y., via Salem, to Rutland, Vt.

A standard gauge road in California, from Laurel Canon to the Echino Ranch, is proposed, the grades in the canon being 150 ft. to the mile.

**New York Central & Hudson River.**—This company's station at Niagara Falls, N. Y., was burned last week, involving a loss of \$50,000.

**New York, Lake Erie & Western.**—The gross and net earnings for December and the three months to December 31, are as follows:

	—December—	1887	1886	—3 mths to Dec. 31—	1887	1886
Gross earnings...	\$2,231,618	\$2,196,419	\$7,171,054	\$6,887,644		
Operating expenses	1,548,418	1,425,408	4,452,687	4,296,332		
Due leased lines...	\$684,230	\$771,011	\$25,076	\$2,591,292		
	202,773	211,771	650,656	619,123		
Net earnings....	\$481,517	\$559,740	\$1,869,711	\$1,072,109		

The gross earnings show an increase of 1.6 per cent., but owing to an increase in expenses of 8.6 per cent., the net earnings show a decrease of 13.9 per cent. For the quarter, the gross earnings increased 4.1 per cent., but the net decreased 5.1 per cent.

**New York & New England.**—The earnings for the quarter ending Dec. 31 show an increase of \$81,647, or 6.4 per cent., in gross earnings; the net earnings show a decrease of \$41,784, caused by an increase in operating expenses of \$123,431.

The statement for the quarter is as follows:

	1887	1886	Inc. or dec.
Gross earnings.....	\$1,344,204	\$1,302,537	L. \$41,667
Operating expenses.....	897,750	774,119	L. 123,631
Net earnings.....	\$446,454	\$528,418	D. \$81,964

**New York, Ontario & Western.**—A committee has been appointed at Edmeston, Otsego County, N. Y., to confer with the officials of this road, in regard to a proposed extension from N. W. Berlin, Chenango County, to Edmeston, a distance of about seven miles. The officers are reported as favoring the project.

**Norfolk & Western.**—Surveys and estimates are being made by this company, it is reported, with a view to double tracking the road from New River to Roanoke and possibly to Lynchburg.

The earnings for December and for the year are as follows:

	—December—	1887	1886	—Year to Dec. 31—	1887	1886
Gross earn.....	\$416,438	\$297,36	\$4,547,94	\$3,257,057		
Expenses.....	224,369	176,325	2,483,780	1,960,900		
Net earn.....	\$192,069	\$121,031	\$1,771,014	\$1,291,148		

The increase in gross earnings for December was \$139,092, or 52 per cent., and in net \$91,048, or 100 per cent. For the year the gross earnings increased \$1,002,737, or 31 per cent., and the net increased 37 per cent. The proportion of expenses to gross earnings during 1887 was 58 per cent., against 60 per cent. the previous year.

**Northern Pacific.**—Last November an issue of \$12,000,000 third mortgage land grant 6 per cent. bonds by this company was authorized. Lately \$8,000,000 of these bonds

have been put on the market. They are secured by a mortgage to the Farmers Loan & Trust Co., as trustee, and the mortgage is a lien upon all the franchises, property and lands, income and earnings of this company, except the land grant in Minnesota and Dakota east of the Missouri River. The \$8,000,000 now offered have been sold to a syndicate, who offered the bonds up to Jan. 26 at 87 1/2. They are now held at 90 and accrued interest.

**Omaha, Horace & Southwestern.**—Articles of incorporation have been filed in Kansas to build a road from a point on the north boundary of Kansas in the county of Jewell or Phillips, southwestward to a point at or near the 36th parallel, a distance of about 253 miles. The capital stock is \$6,000,000, and the incorporators are mostly Kansas parties.

**Oxford & Clarksville.**—Bids are invited until Feb. 10 for the grading, bridging, trestling and tracklaying on this road between Oxford, N. C., and Durham. R. H. Temple, of Richmond, Va., is Chief Engineer.

This North Carolina road will be put in operation to Oxford, Granville County, during this month.

**Pennsylvania.**—A notice has been issued at Philadelphia that parcels belonging to passengers which have heretofore been carried in baggage cars, free, will hereafter be charged for at rates ranging from five cents for a ten pound package to 15 for those weighing 30 pounds. Nothing over 50 will be taken. This regulation applies within 30 miles from Philadelphia, and is chiefly to cover the large "shopping" business of commuters and others. Collection of charges is to be made by means of the sale of stamps which are to be affixed to packages.

The freight yards in Camden, N. J., are to be entirely rearranged. Piling will be driven across the end of the old steamer dock, south of the passenger station, and the entire dock will be filled in. On the land thus made six additional passenger car tracks will be laid, relieving the freight yard of the accumulation of passenger rolling stock. The present freight tracks will be torn up and a new series laid southward in parallel lines. The old freight station will be torn away and a new station built.

**Philadelphia & Reading.**—The statement of this company for December is as follows:

Total gross receipts of railroad...	\$1,715,655	\$1,576,713
Expenses excluding rentals and interest.....	922,024	908,421
Profit.....	\$793,631	\$668,292
The Philadelphia & Reading Coal & Iron Co:		
Gross receipts.....	\$1,573,422	\$1,347,524
Expenses, excluding interest.....	1,619,025	1,364,173
Loss.....	\$46,204	\$1,149
Total of both companies:		
Receipts.....	\$3,289,078	\$2,919,238
Expenses.....	2,541,650	2,272,593
Profit.....	\$747,428	\$646,645

The statement for December, 1887, compared with the same month in 1886, shows:

An increase in gross earnings of.....	\$369,940
An increase in expenses of.....	219,055
An increase in net earnings of.....	\$150,785

**Pittsburgh, Chautauque & Lake Erie.**—Articles of consolidation of the Sugar Grove and the Warren, Sugar Grove & Mayville under this name have been filed in New York. The capital stock is \$1,025,000. Holders of stock in either of the old companies receive two shares of the stock of the new company for each share of the stock of the old companies.

**Pittsburgh, Youngstown & Ashtabula.**—A mortgage for \$4,000,000 has been made in favor of the Farmers' Loan & Trust Co. of New York.

**Pomona & Esinoe.**—This road, which it is proposed to build between the California towns named, will be extended to Claremont to reach several iron mines to be opened there. The Atchison, Topeka & Santa Fe is interested in the enterprise.

**Prattsburgh.**—It is expected that the building and equipment of this standard gauge road will cost about \$130,000. Work will commence early in the spring, and contracts for grading, etc., will be let immediately. C. M. Rinchau, Bath, N. Y., is Superintendent.

**Quincy & Beardstown Short Line.**—The surveyors, who had been compelled to abandon work on account of the cold weather, will be put in the field immediately, and the permanent location between Quincy and Beardstown will be made.

**Rio Grande & Pacific.**—Grading on this road, which is the Utah division of the Denver & Rio Grande, has commenced between Glenwood Springs and Rifle Creek and the survey is in progress in Utah near the White River. Three hundred thousand dollars of the capital stock has been subscribed and \$30,000 has been paid in.

**Rio Grande & Utah.**—The charter for this road, recently reported, was filed in New Mexico last week. The capital stock is \$4,500,000; \$218,000 of the capital has been subscribed for, and of this ten per cent. has been paid in.

**Rochester, Hornellsville & Lackawanna.**—This road was formally opened last week. It is the first road to be opened in New York state this year. Ground was broken Nov. 3, and the last rail was laid Jan. 18. The road extends from Hornellsville, northward about 10 miles, to a connection with the Lackawanna & Pittsburg, near Canaseraga, and the latter connects with the Delaware, Lackawanna & Western at Wayland. This new road turns an additional route from Hornellsville to both eastern and western points and to Rochester; the distance to the last named place is 78 miles. It is said the road is likely to be extended into Pennsylvania.

**St. Paul, Minneapolis & Manitoba.**—The company has bought the right of way from Grafton, Dak., northwest to the boundary line. The survey runs parallel with the old Northern Pacific survey. The company expects this year to build lines from Hinckley to West Superior, Minn.; Huron to Woonsocket, Minn., and Sioux Falls to Yankton, Dak.

**Southern Pacific.**—The company will abandon its extension into the San Joaquin Valley, Cal., for the present.

This company will soon commence construction on a line from Anaheim, Cal., southeast to Tustin, and thence to Santa Anna, passing through McPeerson.

**Tennessee Midland.**—The rails and rolling stock of the first division of this road are all on the ground, and the road will be put in operation between Memphis and Jackson during the spring. It connects with the Illinois Central and the Mobile & Ohio at Jackson.

**Texarkana Northern.**—Construction materials for this road have been purchased, and work will commence in



the spring. The permanent location between Texarkana and Fort Smith has been completed.

**Texas & Pacific.**—The removal of the receivership has been reported, but is not yet complete. The company having shown the Court that it has settled all its obligations, and secured the assent of substantially all its stock and security holders to the plan of reorganization, has applied to the Court to remove the injunction granted at the time the Receivers were appointed sufficiently to permit the execution of the new bonds. This was granted. It is now hoped to commence the delivery of the first mortgage bonds about the end of March.

**Texas, Sabine Valley & Northwestern.**—Grigsby Brothers, contractors for the Carthage extension of this line, have the grading nearly completed and tracklaying is progressing. Beckville is the present terminus, but it is the intention of the management to have the road open for traffic to Carthage by March 10.

**Vancouver, Klickitat & Yakima.**—Active work on the construction of this road will commence in the spring. The work of clearing the right of way will commence in a few days. The road will commence at Vancouver and cross the Cascade Mountains and run through a rich coal and timber country.

**Virginia & North Carolina Construction Co.**—A bill has been introduced in the Virginia Legislature to incorporate this company.

**Wells River.**—It is proposed to raise \$30,000 or \$40,000, in Barre, Vt., to have this road build a line from Barre to the quarries. If this amount is obtained the offices of the company will also be in Barre, instead of Montpelier.

**West Virginia Central.**—At the recent annual meeting, held in Baltimore, it was resolved to extend the line some 32 miles from Thomas, Tucker County, towards Leadville, Randolph County. President Davis was authorized to contract for additional rolling stock.

**Williamsville, Marlborough & Buffalo.**—A company has been incorporated in New York under this name, to build a road from Buffalo to Williamsville, about 10 miles. The capital stock is \$100,000. It is claimed that the right of way has already been secured, and that the road will be built the coming summer. It is also said that the location is a much better one than that of the Buffalo & Williamsville, which was incorporated last March, but which has not been built.

**Wilmington, Onslow & East Carolina.**—Onslow County, North Carolina, has subscribed \$60,000 to this company, \$30,000 to be used in building its road to New Berne, and \$30,000 in building toward Wilmington.

**Winterville & Pleasant Hill.**—A charter has been obtained for this Georgia road by James M. Smith, of Oglethorpe County, and others. The capital stock is \$150,000.

**Yazoo City & Greenville.**—A bill has been introduced in the Mississippi Legislature to incorporate a company by this name.

**Youngstown & Buffalo.**—This is the name of the company, referred to last week, formed to build a road from Youngstown, New York, near the mouth of the Niagara River, to a junction with the Rome, Watertown & Ogdensburg in Lewiston. The survey has already been made.

## TRAFFIC AND EARNINGS.

### The Interstate Commerce Commission.

#### CAR-LOAD RATES.

The hearing of the car-load rate cases was continued at Washington, Jan. 28. Markham Staples, of the New York, Lake Erie & Western; O. J. Geer, General Agent of the Pennsylvania at New York City; S. J. Barclay, Superintendent of the Transfer Station of the Pennsylvania at Mantau, Pa., and N. H. Smith, Transfer Agent of the same road at Pittsburgh, were examined concerning the cost of handling freight in car loads and in smaller lots. Nathan Guilford, of the New York Central, formerly of the Trunk Line Association, testified that in the preparation of the new classification the needs and wishes of shippers were carefully considered.

On Jan. 27, Albert Fink, Commissioner of the Trunk Line Association, testified for the trunk lines, defending the rates now in force. The new classification is now in use on over 47,000 miles of railroad, over which are carried 230,000,000 tons of freight annually, while the former west-bound classification governed only special traffic covering not more than 1,000,000 tons annually. No comparison could be made between the present tariff and the west-bound tariff in vogue prior to the time when the Interstate Commerce law went into effect, because the conditions which have to be complied with under a tariff operating over so extensive a section of country as is covered by the present classification—involving, perhaps, half the railroad traffic of the country—are entirely different in character from the conditions under which a small specific traffic could be controlled.

Mr. Fink then presented a carefully prepared estimate of the relative cost of transporting carload freight and freight in less-than-carloads, which he said showed that the latter cost from 50 to 100 per cent. more than the former, leaving out of consideration the additional cost of handling at stations. Contrary to popular belief, the charges on local traffic were not too high, but too low, and as a matter of fact, the railroads made up for their losses on local traffic through their profits on longer haul freight. Mr. Fink explained the German classification and the points of difference between it and the American practice.

On Saturday, Jan. 28, Mr. Fink was cross-examined by Mr. Sterne. He stated that he had recently made a careful computation of the cost of handling local freights and had found that as a rule short hauls of certain classes of local miscellaneous freight were accomplished at an actual loss, in view of the terminal expenses of loading and unloading. In response to an inquiry from Commissioner Cooley Mr. Fink told of the recent conference looking to the adoption of a uniform classification by the lines east and west of the Mississippi and said that the roads south of the Ohio River had expressed themselves as anxious to join the movement, and that in all probability a meeting of representatives of all the roads interested would soon be held in the interest of this movement.

Peter A. Dey, Railroad Commissioner of Iowa, addressed the Commission in opposition to the petitioners, claiming that a carload was the natural unit for freight shipped in large quantities. The Western classification has 660 articles on which carload rates are named. To abolish carload rates would place the Western jobber at a disadvantage of 10 cents to 100 lbs. as compared with the New York jobber. This difference he thought would be enough to close every jobbing house in the West.

The Nebraska State Board of Transportation sent the following telegram to the Commission:

"We urge the continuance of carload rates. Their abolition

will destroy the jobbing interests of the West. Our distributing houses at Omaha, Lincoln and Fremont are of great benefit to the retail dealers of the state, affording them conveniences and credit. The present system of differential rates builds up trade centres within the state. Their destruction means that Chicago, St. Louis and Eastern cities will monopolize and centralize our trade and drain our resources."

The hearing was closed on Saturday, and counsel will have 60 days, after the testimony is printed, in which to prepare printed briefs.

### Traffic Notes.

The Chicago, Burlington & Quincy has given notice of withdrawal from the Western States Passenger Association.

The Milwaukee, Lake Shore & Western has given notice of withdrawal from the Western and Northwestern Bureau.

Freight rates between Colorado points and the Pacific Coast have been increased, the advance averaging 15 per cent.

The grain rate from Kansas City to Chicago is now 15c. per 100 lbs. by all the lines except the Chicago, Rock Island & Pacific.

Reductions in the price of mileage tickets have now become common in the territory of the Central Traffic Association, a number of roads having announced rates on a basis of 2 cents a mile. These tickets, it will be remembered, are universally limited to one person and to a certain period of time, generally one year.

The Chicago, Burlington & Quincy has withdrawn its guarantee that the Chicago, Burlington & Northern would maintain rates between Chicago and St. Paul. The latter named road takes flour and grain from Minneapolis to New York at 32½ cents to meet the reduction made by the Minneapolis, Sault Ste. Marie & Atlantic.

A Duluth dispatch says that the Northern Pacific is using its freight motive power on that end of the road exclusively in hauling coal to the destitute towns west of there.

The Grand Trunk and the Canadian Pacific have agreed to abolish the payment of ticket commissions in the territory which is common to both of them.

A St. Paul dispatch states that the Minneapolis, Sault Ste. Marie & Atlantic has announced its rates on west-bound freight from the seaboard. They are on a basis of 90 cents first-class, N. W. York to Minneapolis, which is a heavy reduction from the tariffs of the lines via Chicago. It is announced that the Chicago lines have met the reduction.

It is said that one road between Kansas City and Chicago is guaranteeing time on live stock shipments, though in an indirect way. A reasonable time for shipment (by the best route) is agreed upon and the shipper is warranted that the market rate when his stock does actually arrive shall be no lower than it is at the hour previously agreed upon.

### Illinois Freight Rates.

The Illinois Railroad and Warehouse Commission, after an extended hearing, in which the railroad men protested against any action by the commission, has established new maximum rates for local freight traffic within the state, according to the statute. The principal classes were reduced 6 per cent. for all distances from 2 miles to 500 miles. Grain and lumber are reduced 10 per cent. and various commodities reclassified. The new tariff goes into effect Feb. 15.

### Rebates in Illinois.

Judge Gresham in the United States Court at Chicago, has rendered a decision against Bartlett & Co., who made a contract with the Central Iowa road for certain rebates on their shipments. When the road passed into the hands of a receiver a claim for \$3,000 rebates was pending; the Court now decides that the Receiver cannot pay this claim, as the Illinois statute prohibits discriminating in this or any other way.

### Export Rates.

The Export Committee of the Central Traffic Association has reduced export rates about 3 cents a hundred. The new rates are:

To	Provisions.	Lard.	Flour.	Corn.
Livepool.....	40	38	32½	3 ¼
Lond'n.....	44	43	34	3 ½
Glasgow.....	45	44	35	3 ½
Bristol, Avonmouth.....	50	50	34	..
Rotterdam.....	49	49	39½	..
Amsterdam.....	50	50	39½	..
Hamburg.....	47	47	40½	..
Bremen.....	47	47	42	..
Antwerp.....	42	42	34	..

### Coal.

The coal tonnages for the week ending Jan. 28 are reported as follows:

	1888.	1887.	Inc or Dec.	P. c.
Anthracite.....	447,464	676,114	D. 158,650	26.2
Bituminous.....	353,214	260,631	I. 85,583	31.7

The Delaware & Hudson carried 74,604 tons of coal last week, against 90,189 tons in 1887; the Delaware, Lackawanna & Western carried 92,170 tons, against 97,622 in 1887; Lehigh Valley, 67,776, against 48,270 in 1887; Jersey Central, 70,388, against 39,375 tons in 1887.

The coal tonnages of the Pennsylvania road for the week ending Jan. 28 are as follows:

Line of road.....	Coal.	Coke.	Total.
Year 1888 to date.....	235,107	6,336	241,443
Year 1887 to date.....	912,954	3,936	1,25,891
Year 1887 to date.....	802,874	343,568	1,146,442

The Cumberland coal trade for the week ending Jan. 28 amounted to 51,994 tons, and for the year to that date, 249,336 tons.

The official report of the Cumberland coal trade for the year 1887 gives the total output for the year as 3,375,706 tons, exceeding that of the previous year by 783,329 tons, and that of 1884, the heaviest previous year in the history of the region, by 440,817 tons. The year was the first in the region's history in which the output reached 3,000,000 tons. The total output since the opening of the region in 1842 is 55,752,841 tons.

### Cotton.

The cotton movement for the week ending Jan. 27 is reported as follows, in bales:

	1888.	1887.	Inc. or Dec.	P. c.
Receipts.....	74,633	31,948	D. 38,685	51.9
Shipments.....	61,708	89,690	D. 27,982	31.1
Stock.....	398,012	351,361	I. 46,651	13.3

### Seaports.

	1888.	1887.	Inc. or Dec.	P. c.
Receipts.....	90,120	132,531	D. 42,411	32.0
Exports.....	105,549	174,751	D. 69,204	39.1
Stock.....	949,278	932,823	I. 16,455	1.8

### East-bound Shipments.

East-bound through shipments of flour, grain and provisions from Chicago for the week ending Jan. 28 amounted to 28,641 tons, against 30,975 tons the week before. The Chicago & Grand Trunk carried 14.9 per cent.; Michigan Cen-

tral, 15.4; Lake Shore & Michigan Southern, 18.7; Pittsburgh, Fort Wayne & Chicago, 18.5; Chicago, St. Louis & Pittsburgh, 11.7; Baltimore & Ohio, 13.4; New York, Chicago & St. Louis, 7.3; Cincinnati, Indianapolis, St. Louis & Chicago, 8 per cent.

### Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of December:	1887.	1888.	Inc or Dec.	P. c.
Allegheny V. R. R.	\$179,048	\$159,799	I. \$22,499	14.0
Net.....	61,539	61,337	I. 202	0.3
Cent. of Georgia.....	741,124	665,919	I. 94,605	14.9
Net.....	163,746	141,411	I. 22,335	5.4
Central of N. J.	974,880	965,925	D. 8,955	2.1
Net.....	411,857	457,987	D. 46,130	10.0
Chi. St. L. & P.	123,407	409,435	I. 328,028	265.5
Net.....	125,666	128,528	I. 2,862	2.5
F. W. & D. C.	74,093	46,251	I. 27,842	37.6
Net.....	30,129	21,848	I. 8,281	26.1
Memphis & Chas.	190,354	177,797	I. 12,557	7.0
Net.....	77,418	35,287	I. 42,131	54.3
N. Y., L. E. & W.	2,237,614	2,196,420	I. 41,194	1.9
Net.....	481,517	579,741	D. 98,224	20.2
N. Y., Ont. & W.	119,485	98,555	I. 20,930	17.5
Net.....	2,557	2,838	I. 281	11.2
Norfolk & West.	436,418	277,336	I. 159,082	36.5
Net.....	182,059	91,011	I. 91,048	100.0
Pennsylvania.....	4,892,954	4,478,216	I. 414,738	10.6
Net.....	1,381,895	1,398,182	D. 16,287	1.2
Pennsylvania:				
Norfolk & W. Sys.	1,585,696	1,750,936	I. 165,240	10.4
Net.....	394,782	55,374	I. 339,408	86.3
South'n Sys.	1,987,917	1,166,064	I. 821,853	41.4
Net.....	255,889	27,967	I. 227,922	89.3
Phila. & Read.	1,715,636	1,576,714	I. 138,922	8.7
Net.....	703,632	608,292	I. 95,340	13.6
Phila. & R. C. & I.	1,573,432	1,345,454	I. 227,978	14.5
Net.....	46,304	21,640	I. 24,664	53.1
T. & A. N. Y. & P.	3,280,678	2,901,298	I. 379,380	11.6
Net.....	717,438	6,643	I. 710,795	15.5
West. N. Y. & P.	237,131	104,762	I. 132,369	55.8
Net.....	56,137	2,800	I. 53,337	95.2
Total (gross).....	\$16,724,863	\$15,104,031	I. \$1,620,832	10.8
Total (net).....	4,022,488	4,877,401	I. 854,913	21.3

### Month of November:

	1887.	1888.	Inc or Dec.	P. c.
Oreg. Imp. Co.	\$792,252	\$266,789	I. \$525,463	66.3
Net.....	103,737	59,781	I. 43,956	42.4
Wabash.....	590,850	581,540	I. 9,310	1.6
Net.....	117,909	158,969	D. 41,060	25.7

### Two months—Nov. 1 to Dec. 31:

	1887.	1888.	Inc or Dec.	P. c.
F. W. & D. C.	\$147,860	\$98,727	I. \$49,133	33.3
Net.....	60,411	54,117	I. 6,294	10.4

### Three months—Oct. 1 to Dec. 31:

	1887.	1888.	Inc or Dec.	P. c.
N. Y., L. E. & W.	\$7,171,054	\$6,837,644	I. \$333,410	4.7
Net.....	1,869,711	1,972,169	D. 102,458	5.2
N. Y., O. & West.	396,774	327,108	I. 69,666	17.6
Net.....	55,014	36,531	I. 18,483	33.6
W. N. Y. & Pa.	730,759	630,862	I. 99,897	13.7
Net.....	157,703	40,240	I. 117,463	74.6

### Eleven months—Dec. 1 to Nov. 31:

	1887.	1888.	Inc or Dec.	P. c.
Oregon Imp. Co.	\$1,031,971	\$29,617	I. \$1,002,354	97.1
Net.....	1,135,116	725,204	I. 409,912	36.2

### Year to December 31, 1887:

	1887.	1888.	Inc or Dec.	P. c.
Allegheny Valley.	\$2,229,168	\$1,812,729	I. \$416,439	18.7
Net.....	797,769	681,240	I. 116,529	14.7
Cent. & Atl. & B.	678,644	709,099	D. 30,455	4.5
Net.....	138,564	137,775	I. 789	0.6
Cent. of Georgia.	6,779,597	6,217,377	I. 562,220	8.3
Net.....	2,422,663	2,023,941	I. 398,722	16.4
Central of N. J.	11,588,555	10,742,892	I. 845,663	7.4
Net.....	5,088,555	4,438,793	I. 649,762	12.8
Chi. St. L. & P.	5,861,764	4,843,317	I. 1,018,447	17.3
Net.....	1,566,187	876,016	I. 690,171	44.1
F. W. & D. C.	719,644	445,481	I. 274,163	38.1
Mem. & Chas.	301,828	204,828	I. 97,000	32.1
Mem. & Chas.	1,740,559	1,444,678	I. 295,881	17.0
Net.....	442,672	444,122	D. 1,450	0.3
N. Y., L. E. & W.	24,464,236	23,002,509	I. 1,461,727	6.4
Net.....	6,172,878	6,838,816	D. 665,938	10.8
N. Y., O. & West.	1,550,168	1,338,385	I. 211,783	13.8
Net.....	304,121	192,367	I. 111,754	36.8
Norfolk & West.	4,742,794	3,235,057	I. 1,507,737	31.8
Net.....	1,771,014	1,391,147	I. 379,867	21.3
Pennsylvania.....	55,671,703	50,379,688	I. 5,292,015	9.5
Net.....	18,784,728	17,759,482	I. 1,025,246	5.5
Pennsylvania:				
N. West. S. S.	18,532,322	15,460,215	I. 3,072,107	16.8
Net.....	6,118,883	5,576,246	I. 542,637	8.9
S. West. Sys.	14,789,552	12,002,449	I. 2,787,103	19.0
Net.....	3,711,075	2,810,027	I. 901,048	24.2
West. J. and B.	1,469,214	1,352,416	I. 116,798	8.0
Net.....	492,955	503,274	D. 10,319	2.1
W. N. Y. & Pa.	2,816,295	2,573,220	I. 243,075	8.6
Net.....	607,515	412,772	I. 194,743	32.1
Total (gross).....	\$151,459,581	\$125,473,075	I. \$25,986,506	17.3
Total (net).....	49,036,058	43,018,119	I. 6,017,939	12.3

### Year to Nov. 30, 1887: